mathways 5

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mathways 5

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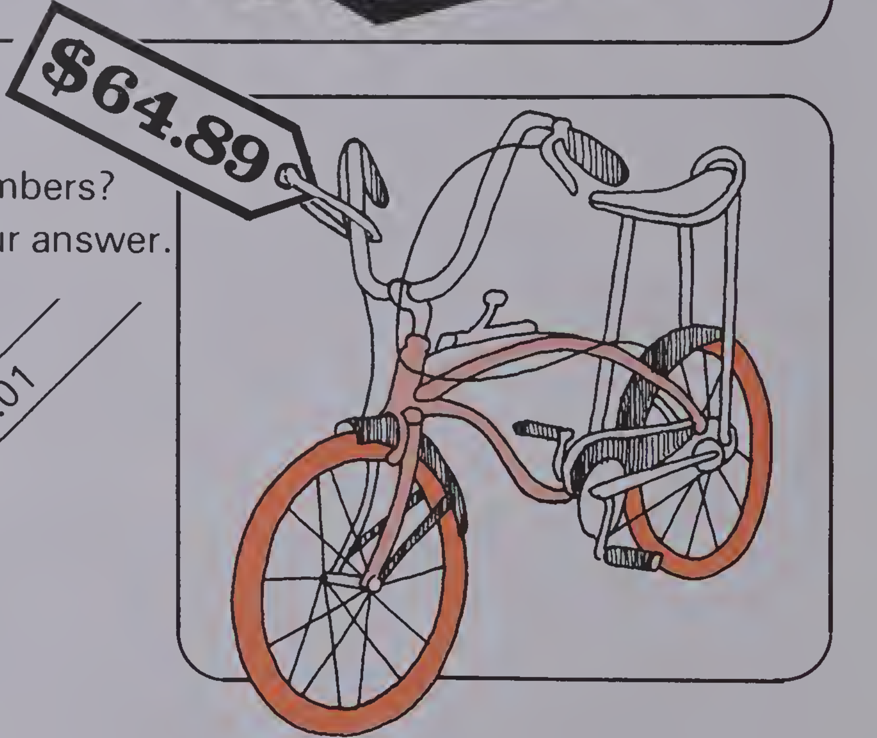
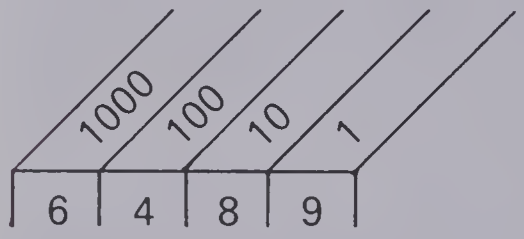
I Leventhal

EXPLORE

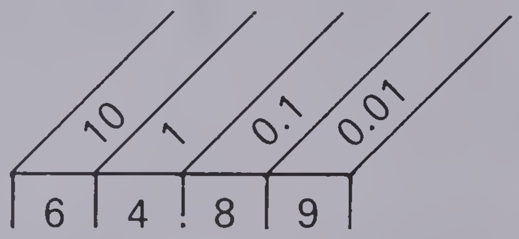
PLACE VALUE/The Meaning Depends on the Place



Look at the price tags. The digits are the same but the amounts are different.
What is the meaning of each digit in each of the numbers?
Use these place value charts to help you explain your answer.



CAR



BICYCLE

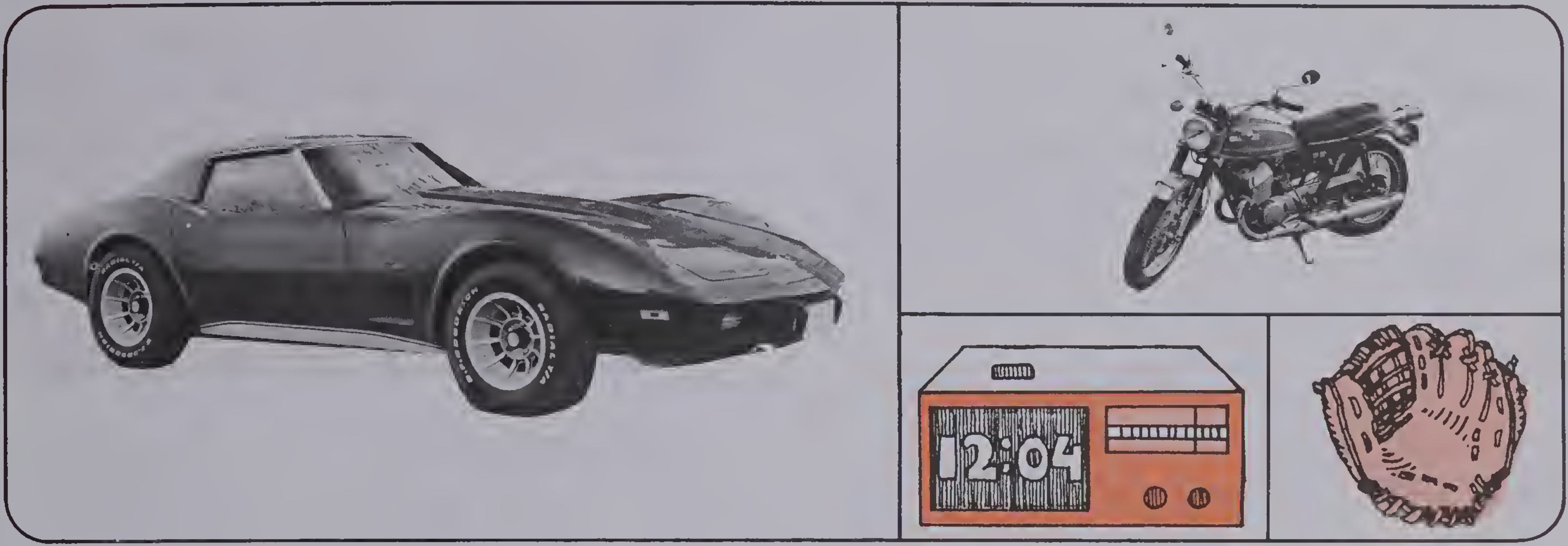
IN ACTION

1. Give the value of the coloured digit.
   - a) 24.63
   - b) 1379
   - c) 57.24
   - d) 3902
   - e) 82.10
   - f) 4045
   - g) 91.36
   - h) 6581
   - i) 3698
   - j) 78.57
   - k) 4229
   - l) 83.04
2. How much greater is the first number than the second?
   - a) 42.76; 41.76
   - b) 4017; 3017
   - c) 73.52; 73.42
   - d) 8149; 8139
   - e) 27.04; 27.03
   - f) 6605; 6505
   - g) 29.63; 19.63
   - h) 9422; 9421

3. Write the numeral for each of the following.

a) three thousand, seven hundred, and sixty
b) twenty-nine decimal four two
c) seven thousand, three hundred, and four
d) fifty-two decimal one six
e) one thousand, eight hundred, and twenty-one
f) eighty-one decimal five nine

4. The digits 8, 7, 9, 0 are used in the prices of each item.
They are used in the order given. The 0 may or may not be used.
Write the price of each.



5. Add 1 to each number.

a) 229 b) 29 c) 2.9 d) 0.29
e) 0.45 f) 4.5 g) 45 h) 445

6. Subtract 1 from each number.

a) 1.7 b) 11.1 c) 30.1 d) 500.7
e) 41.6 f) 15.6 g) 1.9 h) 100.1

7. Increase each digit by 1. How much greater is the new number than the given number?

a) 39 b) 19 c) 8 d) 247
e) 581 f) 6701 g) 5999 h) 492

8. Decrease each digit by 1. How much greater is the given number than the new number?

a) 28 b) 16 c) 4 d) 365
e) 739 f) 2392 g) 4111 h) 572

9. Move the decimal point one place to the right and add 100. What is the new number?

a) 39.7 b) 3.97 c) 6.5 d) 478.69
e) 140.8 f) 0.9 g) 9.3 h) 631.52

10. Move the decimal point one place to the left and add 10. What is the new number?

a) 44.8 b) 36 c) 7.8 d) 382.4
e) 109 f) 795.2 g) 5.9 h) 637.4

Thousands to Hundredths

USED CARS

MUSTANG II HARDTOP

2.3 ℓ 4-cylinder engine
automatic, AM/FM radio
w/w steel-belted tires

$4523.98

WAYS TO EXPLAIN $4523.98
(read as "four thousand, five hundred and twenty-three dollars, and ninety-eight cents")

MEANING
4 thousands, 5 hundreds, 2 tens, 3 ones, 9 tenths, and 8 hundredths

EXPANDED FORM
4000 + 500 + 20 + 3 + 0.9 + 0.08

PLACE VALUE CHART

1000	100	10	1	0.1	0.01
4	5	2	3	9	8

IN ACTION

Write the numerals.

1. a) 3 thousands, 5 hundreds, 7 tens, 6 ones, 1 tenth, and 4 hundredths
   b) 7 thousands, 2 hundreds, 8 tens, 1 one, 3 tenths, and 9 hundredths
   c) 4 thousands, 7 hundreds, 2 tens, 9 ones, 8 tenths, and 3 hundredths
   d) 8 thousands, 3 hundreds, 1 ten, 7 ones, 6 tenths, and 5 hundredths
   e) 2 thousands, 6 hundreds, 4 tens, 5 ones, 0 tenths, and 1 hundredth
   f) 6 thousands, 9 hundreds, 0 tens, 3 ones, 2 tenths, and 7 hundredths
   g) 1 thousand, 0 hundreds, 3 tens, 4 ones, 5 tenths, and 6 hundredths
   h) 5 thousands, 1 hundred, 6 tens, 0 ones, 4 tenths, and 2 hundredths
   i) 9 thousands, 4 hundreds, 5 tens, 2 ones, 7 tenths, and 0 hundredths
   j) 2 thousands, 8 hundreds, 9 tens, 8 ones, 9 tenths, and 8 hundredths

2. a) 3000 + 700 + 20 + 5 + 0.4 + 0.09 b) 4000 + 100 + 60 + 7 + 0.5 + 0.03
   c) 2000 + 400 + 0 + 6 + 0.1 + 0.05 d) 9000 + 300 + 10 + 8 + 0.2 + 0.07
   e) 6000 + 500 + 40 + 3 + 0.0 + 0.01 f) 3000 + 800 + 90 + 2 + 0.7 + 0.04
   g) 7000 + 200 + 30 + 0 + 0.9 + 0.06 h) 8000 + 900 + 80 + 9 + 0.8 + 0.02
   i) 5000 + 600 + 70 + 1 + 0.3 + 0.08 j) 1000 + 0 + 50 + 4 + 0.6 + 0.02

3. a)

1000	100	10	1	0.1	0.01
8	4	5	1	7	2

b)

1000	100	10	1	0.1	0.01
6	2	9	7	0	4

c)

1000	100	10	1	0.1	0.01
9	2	7	2	3	1

d)

1000	100	10	1	0.1	0.01
8	1	5	5	2	3

e)

1000	100	10	1	0.1	0.01
7	6	9	8	0	1

f)

1000	100	10	1	0.1	0.01
2	0	8	6	9	1

g)

1000	100	10	1	0.1	0.01
3	5	0	7	4	6

h)

1000	100	10	1	0.1	0.01
7	9	7	5	8	3

Use the method suggested to explain the numbers.

4. Meaning
   a) 5130.27 b) 8310.95 c) 2319.04 d) 6903.17 e) 8078.41
   f) 5722.88 g) 3446.69 h) 7192.52 i) 4643.58 j) 1824.69

5. Expanded Form
   a) 1879.02 b) 1514.63 c) 9510.74 d) 7688.95 e) 6487.51
   f) 5933.04 g) 8123.40 h) 9879.56 i) 5351.24 j) 4460.57

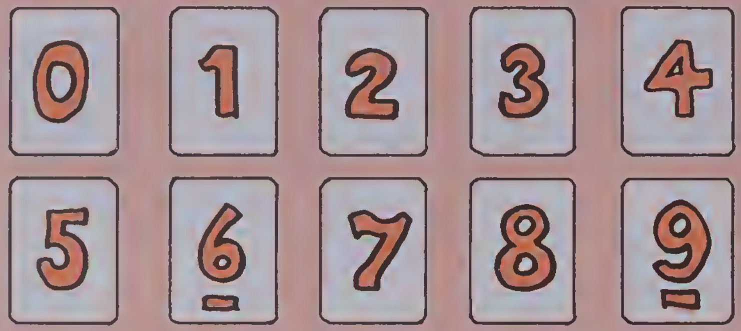
6. Place Value Chart
   a) 3205.41 b) 5748.63 c) 7651.09 d) 2394.76 e) 4830.25
   f) 9123.57 g) 8156.30 h) 6479.12 i) 1962.84 j) 5087.98

7. What is the value of each coloured digit?
   a) 736**9**.62 b) **7**130.96 c) 6**7**43.02 d) **3**057.19 e) 1487.**0**8
   f) 5**9**01.38 g) 2980.7**1** h) 4012.**2**8 i) 2259.1**7** j) 96**6**4.43
   k) 4319.**6**5 l) 88**2**2.75 m) 437**8**.51 n) 174**5**.86 o) **4**132.55

8. Build 2 different 6-digit numbers for each part.
   a) 4 in the thousands place b) 7 in the tenths place c) 0 in the ones place
   d) 2 in the hundreds place e) 8 in the hundredths place f) 6 in the tens place

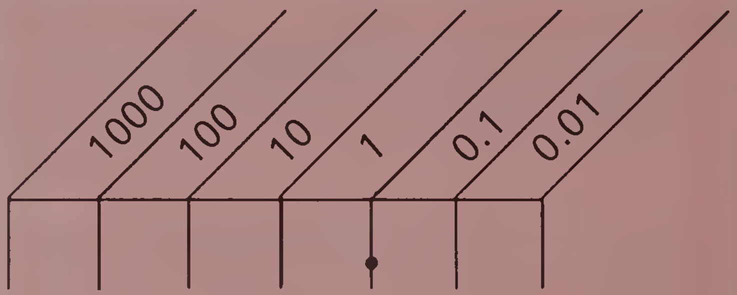
Greatest Number (3 to 6 Players)

A


0
1
2
3
4
5
6
7
8
9

Make a deck of cards
like this.

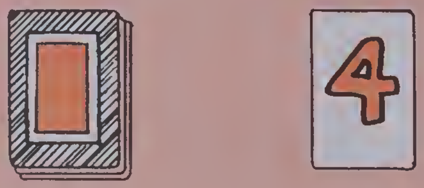
B


1000
100
10
1
0.1
0.01

Each player makes a place
value chart like this.

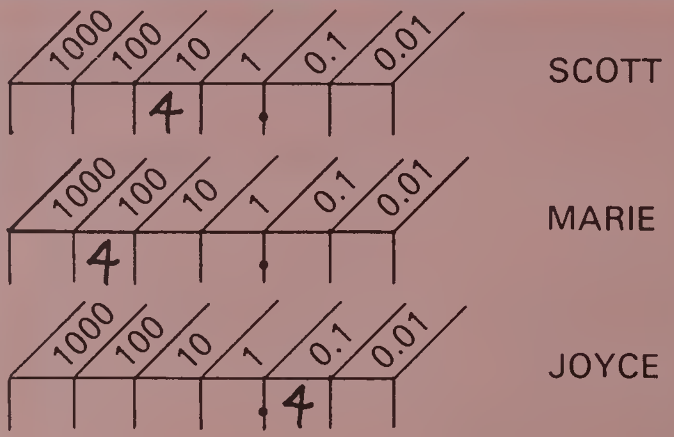
C

Shuffle the cards and
place the deck face down.



The first player draws a card
and places it face up
beside the deck.

D

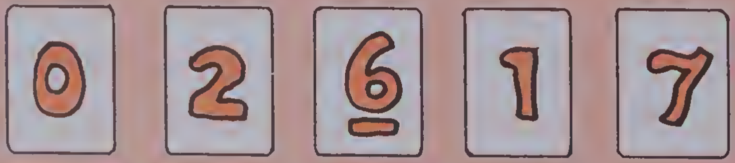

1000
100
10
1
0.1
0.01
4
SCOTT
1000
100
10
1
0.1
0.01
4
MARIE
1000
100
10
1
0.1
0.01
4
JOYCE

The players wrote the numerals
in these places.

E

Scott put the 4 in the tens place,
Marie in the hundreds place
and Joyce in the tenths place.

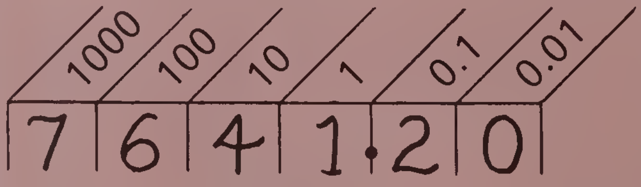
The next 5 cards drawn were



in that order.

F

Scott wrote the numerals in these places.


1000
100
10
1
0.1
0.01
7
6
4
1
2
0

Could Marie or Joyce have beaten him?
Why?

PLAY THIS GAME YOURSELF.

ADDITION AND SUBTRACTION / Addition / Regrouping

ADD.
46.57
38.64

Expanded Form

46.57 = 40 + 6 + 0.5 + 0.07
38.64 = 30 + 8 + 0.6 + 0.04
70 + 14 + 1.1 + 0.11
= 85.21

46.57
38.64
85.21

Think	Record
11	1
7, 12	2
9, 15	5
4, 8	8

IN ACTION

1. Add. Use the expanded form.

a) 41.96	b) 6497	c) 36.95	d) 1788	e) 58.19
27.85	2836	49.27	3456	27.04

2. Add.

a) 6125	b) 34.11	c) 2658	d) 53.32	e) 3274
884	17.25	4279	27.64	2583
f) 3426	g) 83.58	h) 7576	i) 72.83	j) 6426
5997	57.76	2734	43.98	3545

3. Find the total amount.

a) \$16.50	b) \$64.50	c) \$53.29	d) \$54.50	e) \$47.15
31.75	19.88	42.98	33.87	26.49
f) \$30.08	g) \$35.55	h) \$36.54	i) \$84.71	j) \$65.78
17.16	23.87	40.67	19.68	28.47

4. Last Saturday, Shauna went to the movies. The admission was \$1.25. She bought popcorn for 40¢ and an orange drink for 25¢. What was her total cost?

Subtraction / Regrouping

SUBTRACT.

$$\begin{array}{r} 34.56 \\ \underline{16.37} \end{array}$$

Expanded Form

$$\begin{array}{rcl} 34.56 & = & 20 + 14 + 0.4 + 0.16 \\ \underline{16.37} & = & \underline{10 + 6 + 0.3 + 0.07} \\ & & 10 + 8 + 0.1 + 0.09 \\ & = & 18.19 \end{array}$$

$$\begin{array}{r} 34.56 \\ \underline{16.37} \\ 18.19 \end{array}$$

Think	Record
16, 9	9
4, 1	1
14, 8	8
2, 1	1

IN ACTION

1. Subtract. Use the expanded form.

a) $\begin{array}{r} 711 \\ \underline{546} \end{array}$ b) $\begin{array}{r} 332 \\ \underline{174} \end{array}$ c) $\begin{array}{r} 60.2 \\ \underline{48.9} \end{array}$ d) $\begin{array}{r} 4.14 \\ \underline{3.29} \end{array}$ e) $\begin{array}{r} 5.21 \\ \underline{2.49} \end{array}$

2. Subtract.

a) $\begin{array}{r} 317 \\ \underline{78} \end{array}$ b) $\begin{array}{r} 714 \\ \underline{347} \end{array}$ c) $\begin{array}{r} 92.0 \\ \underline{44.9} \end{array}$ d) $\begin{array}{r} 8.44 \\ \underline{5.56} \end{array}$ e) $\begin{array}{r} 2.37 \\ \underline{0.49} \end{array}$

3. Subtract.

a) $\begin{array}{r} 4745 \\ \underline{2347} \end{array}$ b) $\begin{array}{r} 5223 \\ \underline{2045} \end{array}$ c) $\begin{array}{r} 663.3 \\ \underline{147.5} \end{array}$ d) $\begin{array}{r} 93.12 \\ \underline{41.59} \end{array}$ e) $\begin{array}{r} 33.07 \\ \underline{12.18} \end{array}$

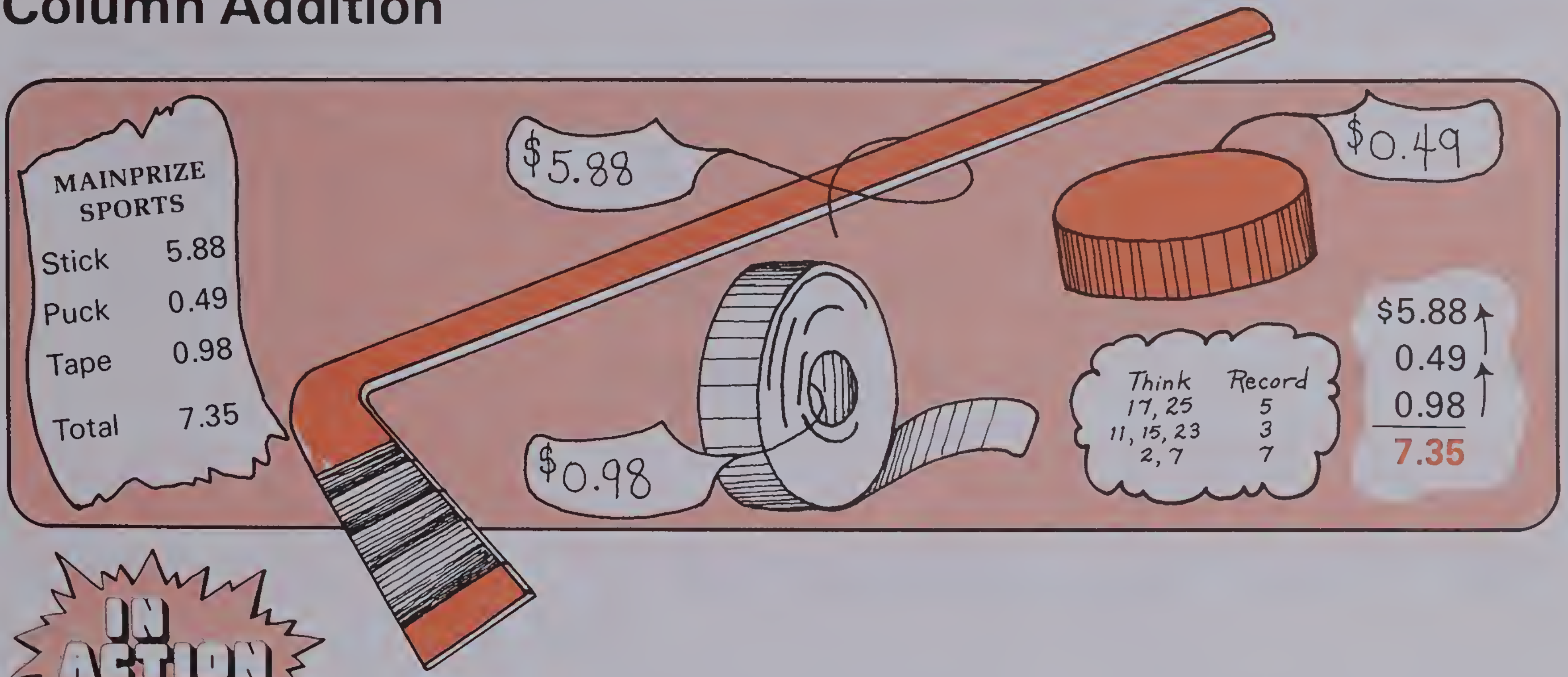
f) $\begin{array}{r} 4814 \\ \underline{1638} \end{array}$ g) $\begin{array}{r} 76.03 \\ \underline{53.58} \end{array}$ h) $\begin{array}{r} 44.21 \\ \underline{22.25} \end{array}$ i) $\begin{array}{r} 62.17 \\ \underline{40.30} \end{array}$ j) $\begin{array}{r} 35.33 \\ \underline{2.58} \end{array}$

4. Find the difference in amount.

a) $\begin{array}{r} \$76.15 \\ \underline{54.92} \end{array}$ b) $\begin{array}{r} \$24.35 \\ \underline{13.57} \end{array}$ c) $\begin{array}{r} \$44.15 \\ \underline{33.35} \end{array}$ d) $\begin{array}{r} \$19.40 \\ \underline{0.56} \end{array}$ e) $\begin{array}{r} \$49.50 \\ \underline{26.07} \end{array}$

5. The basic price of a car is $4758.00. The same car with options added is $6123.00. What is the difference in price?

Column Addition


MAINPRIZE SPORTS
Stick 5.88
Puck 0.49
Tape 0.98
Total 7.35
$5.88
$0.49
$0.98
Think Record
17, 25 5
11, 15, 23 3
2, 7 7
$5.88
0.49
0.98
7.35

IN ACTION

1. Add.

a)	b)	c)	d)	e)	f)	g)
8	5	4	6	9	7	4
4	8	9	3	7	7	3
2	7	9	9	6	9	8

2. Add.

a)	b)	c)	d)	e)	f)	g)
21	19	18	17	26	56	37
32	32	43	18	25	23	89
56	49	27	19	49	43	44

3. Find the total amount.

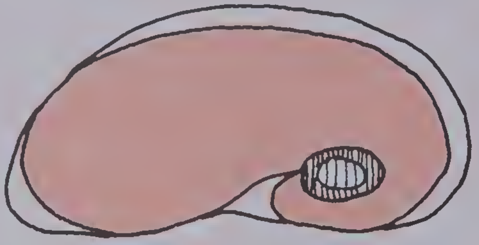
a)	b)	c)	d)	e)
$1.27	$2.53	$3.18	$1.67	$2.43
4.44	3.93	3.77	2.24	1.56
1.67	4.28	6.51	2.49	1.43

4. Find the total amount.

a)	b)	c)	d)	e)
$1.37	$0.27	$0.29	$0.06	$0.05
9.52	3.06	0.25	0.10	2.75
0.58	0.09	8.04	1.49	5.50

5. For the hockey season, you need to buy a hockey sweater $6.95, socks $3.75, and a helmet $9.85. What is the total cost?

Shopping at the Supermarket



SIRLOIN STEAKS

$3.72 /kg

FRESH CHICKEN

$1.50 /kg

PRIME RIB ROAST

$3.28 /kg

SPECIAL

Bananas	1 kg	$ 0.26
Oranges	10	0.79
Grapefruit	10	0.99

Bacon	$ 2.59/kg
Sausages	2.84/kg
Wieners	2.16/kg
Cold Cuts	1.06/kg

SPECIAL

Beans	400 ml tin	$ 0.24
Corn	400 ml tin	0.35
Peas	400 ml tin	0.29

SAVE

PRODUCE

Apples	2 kg $1.50
Carrots	3 bunches $1.00
Cucumbers	each 20¢
Lettuce	1 head 49¢
Potatoes	2 kg 48¢
Tomatoes	1 kg $1.09

STAPLES

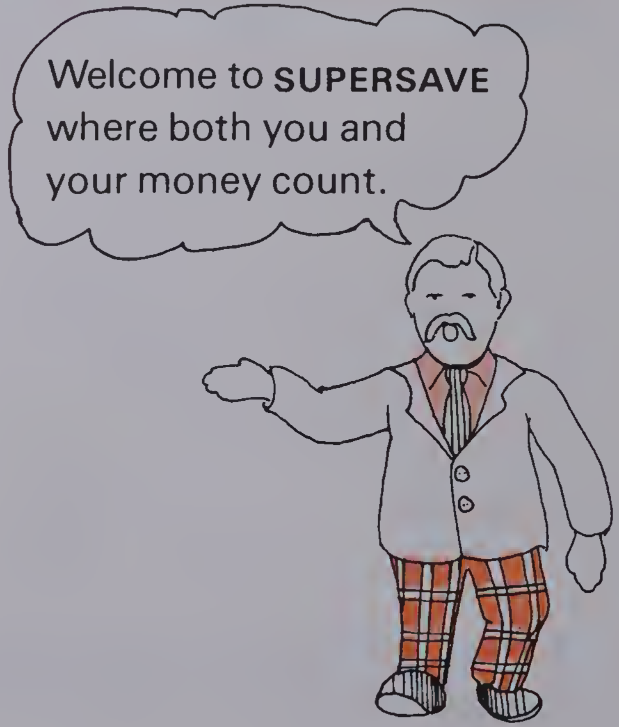
Flour	3 kg $1.39
Coffee	1 kg $3.44
Tea	60 bags 95¢

CANNED GOODS

Apple Juice	1.5 ℓ 74¢
Salmon	200 g $1.11
Tomato Soup	300 ml 21¢
Spaghetti	3 pkgs. $1.00
Tuna Fish	200 g 82¢

DAIRY

Butter	1 kg $2.18
Cheese	1 kg $3.28
Eggs	10 92¢
Milk	1 ℓ 58¢


Welcome to SUPERSAVE where both you and your money count.

IN ACTION

1. What is the total cost for the items on each shopping list?

a)

Shopping List

1 kg bananas	$ 0.26
1 kg bacon	2.59
1 l milk	0.58

b)

Shopping List

2 kg apples	$ 1.50
2 kg potatoes	0.48
3 kg flour	1.39

c)

Shopping List

10 eggs	$0.92
1 kg sausages	2.84
60 bags tea	0.95

d)

Shopping List

3 bunches carrots
1 head lettuce
1 kg tomatoes

e)

Shopping List

1 tin salmon
1 tin tuna
1 kg butter

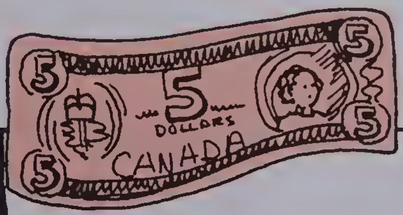
f)

Shopping List

1 2-kg chicken
2 kg potatoes
2 tins peas

2. How much change?

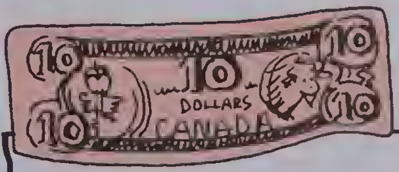
a)



Shopping List

10 oranges
10 grapefruit
2 kg apples

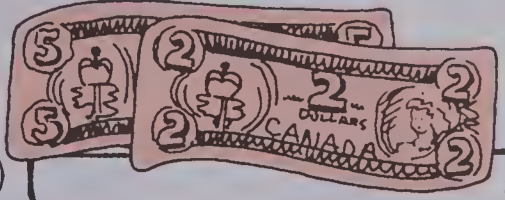
b)



Shopping List

1 2-kg roast
2 kg potatoes
2 cans corn

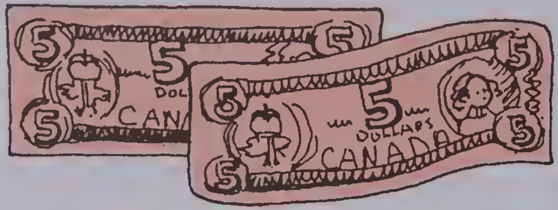
c)



Shopping List

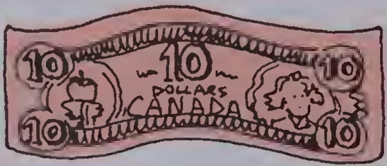
1 kg wieners
3 l milk
1 kg butter

d)



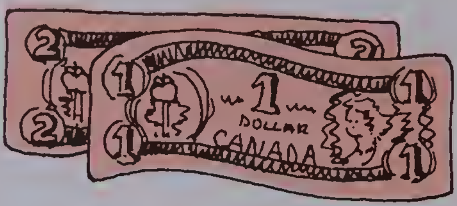
Shopping List
2 kg steak
3 bunches carrots
1 kg tomatoes

e)

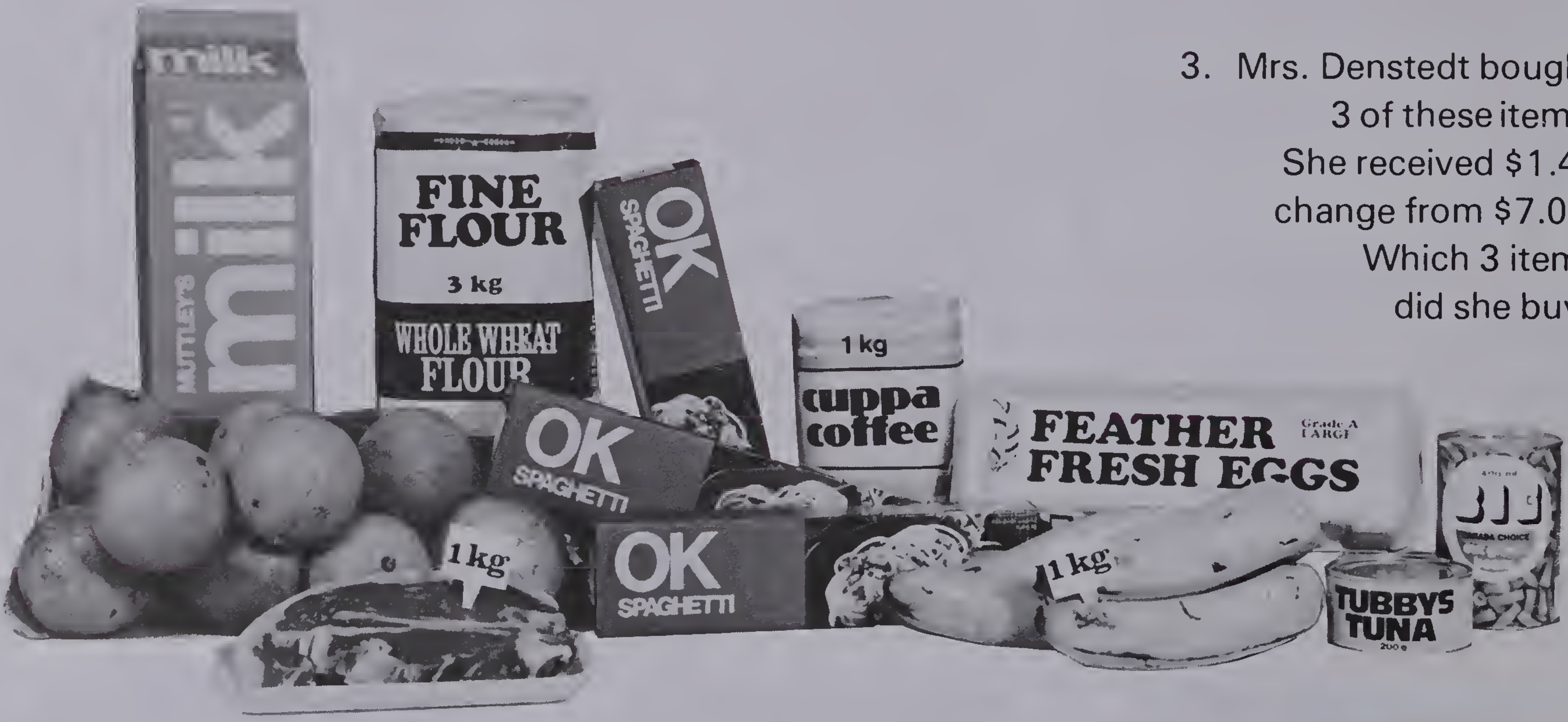


Shopping List
1 pkg. cold cuts
1 kg cheese
1 head lettuce

f)



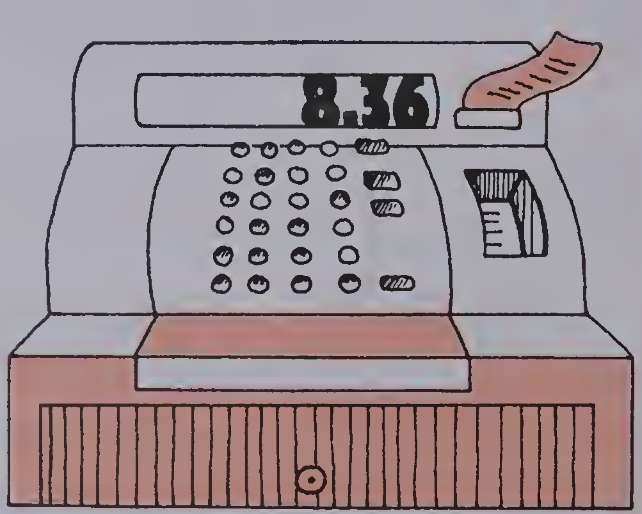
Shopping List
10 eggs
1.5 l milk
4 cans soup


milk
MUTTLEY'S milk
FINE FLOUR
3 kg
WHOLE WHEAT FLOUR
OK SPAGHETTI
1 kg
cuppa coffee
FEATHER FRESH EGGS
Grade A LARGE
OK SPAGHETTI
1 kg
OK SPAGHETTI
1 kg
TUBBYS TUNA
200 g

3. Mrs. Denstedt bought 3 of these items. She received $1.48 change from $7.00. Which 3 items did she buy?

4. Luckily, Mrs. Sonoski checked and found the error. Can you?

Shopping List
2 heads lettuce
2 l milk
3 pkg. spaghetti
1 kg bacon
3 cans soup



SUPERSAVE
— 0.98
— 1.16
— 3.00
— 2.59
— 0.63

T 8.36

Think About 9

Complete.

$1 \times 9 + 2 = 11$

$12 \times 9 + 3 = 111$

$123 \times 9 + 4 = ?$

$1234 \times 9 + ? = ?$

$12345 \times 9 + ? = ?$

$? \times ? + ? = ?$

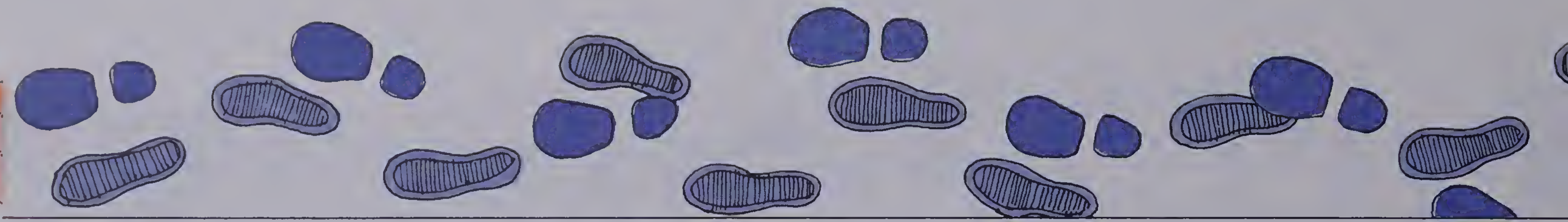
$? \times ? + ? = ?$

Choose a 2-digit number.	42
Reverse the digits.	24
Subtract.	18
Reverse the digits.	81
Add.	99

Try this for other 2-digit numbers.

Add.	Add the digits of each addend. Subtract 9 if the sum is 9 or greater than 9.	
438	15	15 − 9 = 6
27	9	9 − 9 = 0
62	8	8 = 8
307	10	10 − 9 = 1
834		Add. 15
8 + 3 + 4 = 15		1 + 5 = **6**
15 − 9 = **6**		

This process of adding digits and subtracting 9 could be used as a way of checking addition.



Retrace Your Steps

1. Show each number as a column addition question.
The first one is completed.

a) 6432.57
means add 6000
400
30
2
0.5
0.07
6432.57

b) 940.08
c) 2174.01
d) 6784.36
e) 8000.79
f) 1111.11
g) 9999.99

2. a) I am a 2-digit number. Add 1, and I become a 3-digit number. What number am I? What number do I become?
b) I am made up of 3 digits. O is my first digit. When 0.01 is added to me, I become 1. What number am I?

3. Find the total amount.

a) $1.99	b) $7.98	c) $17.49	d) $84.36	e) $175.23
0.79	3.95	29.38	91.75	254.86
0.59	4.61	65.25	89.90	29.35
f) $350.50	g) $273.25	h) $673.75	i) $ 3.98	j) $217.49
68.80	419.95	12.95	11.67	354.11
9.95	199.88	24.50	19.95	299.99

4. Find the difference in amount.

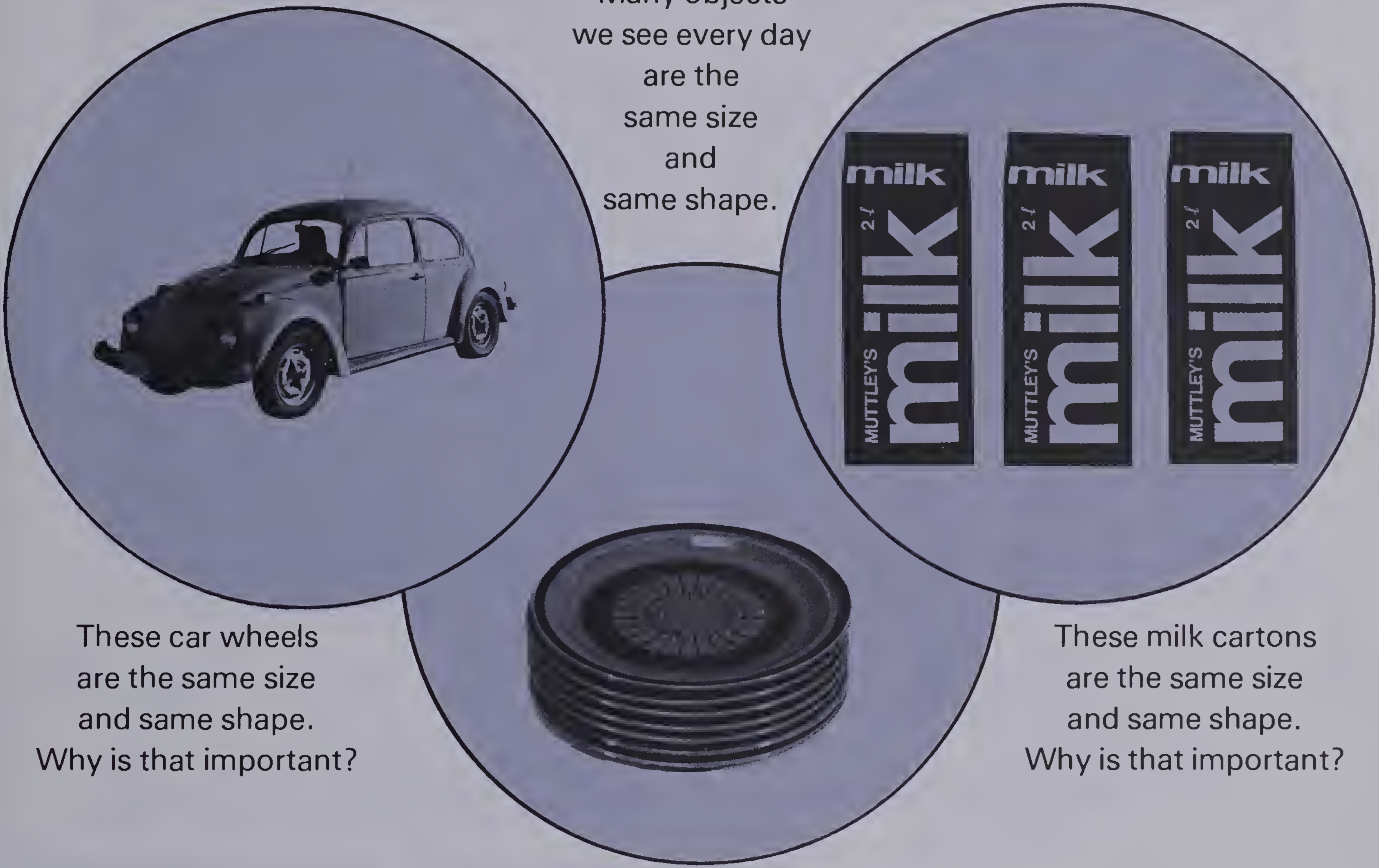
a) $15.38	b) $9.91	c) $24.50	d) $8.80	e) $39.18
12.95	8.59	6.75	5.90	9.19
f) $365.80	g) $895.50	h) $900.00	i) $800.00	j) $111.11
129.95	699.40	899.99	599.99	100.00

5. When the tax is added, I cost $9.45.
My tax can be paid with 3 different coins.
Can you find my 10 possible costs before the tax is added?

EXPLORE

CONGRUENCY/ Congruent Shapes

Many objects
we see every day
are the
same size
and
same shape.


milk
2 ℓ
MUTTLEY'S
milk
milk
2 ℓ
MUTTLEY'S
milk
milk
2 ℓ
MUTTLEY'S
milk

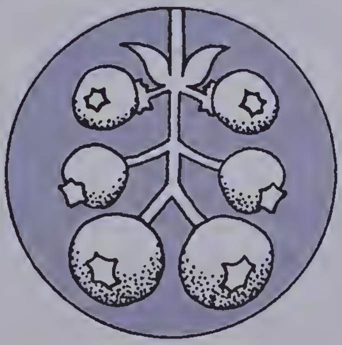
These car wheels
are the same size
and same shape.
Why is that important?

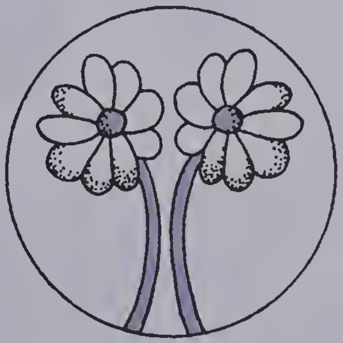
These milk cartons
are the same size
and same shape.
Why is that important?

Dinner plates in a set of dishes
are the same size and same shape.
Why is that important?

Objects which are the same size and same shape are **congruent.**

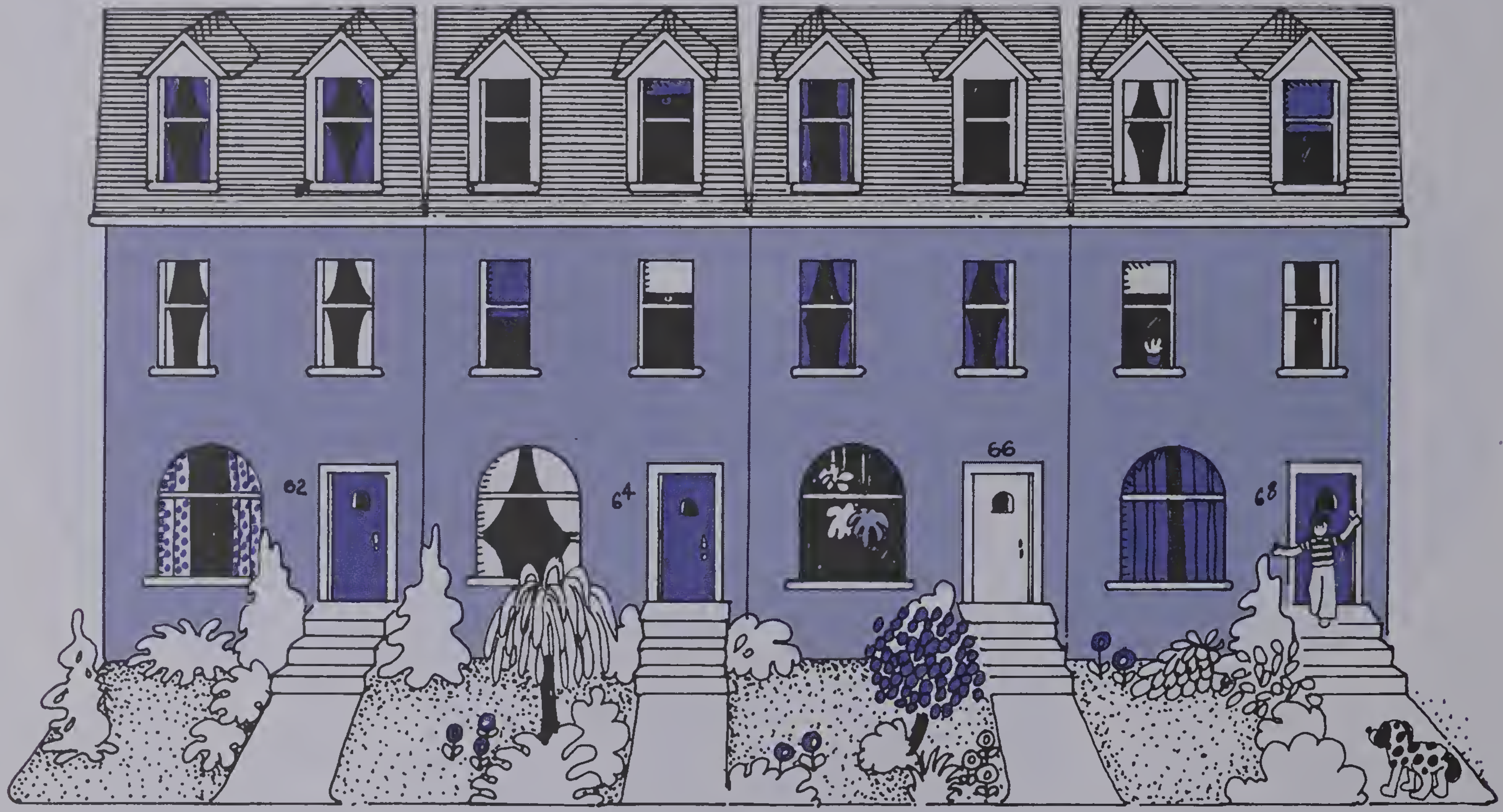
Look for
congruency
in these pictures.





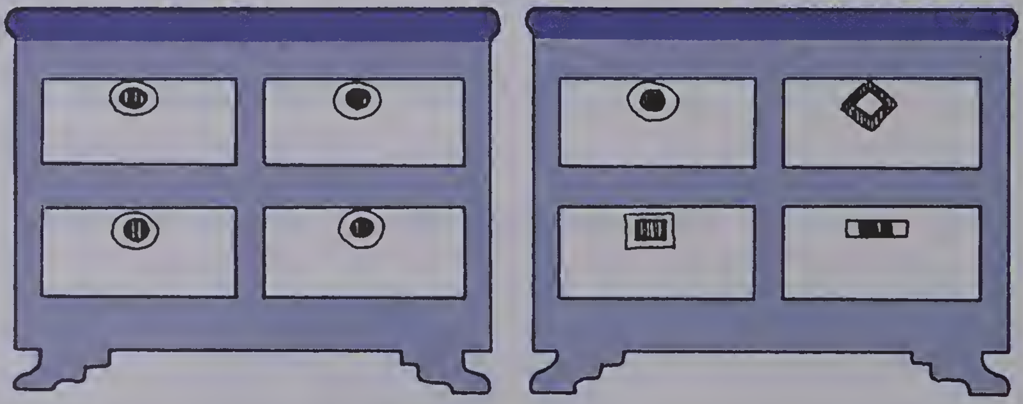
Name other
objects in nature
that show congruency.

Think about congruent shapes.



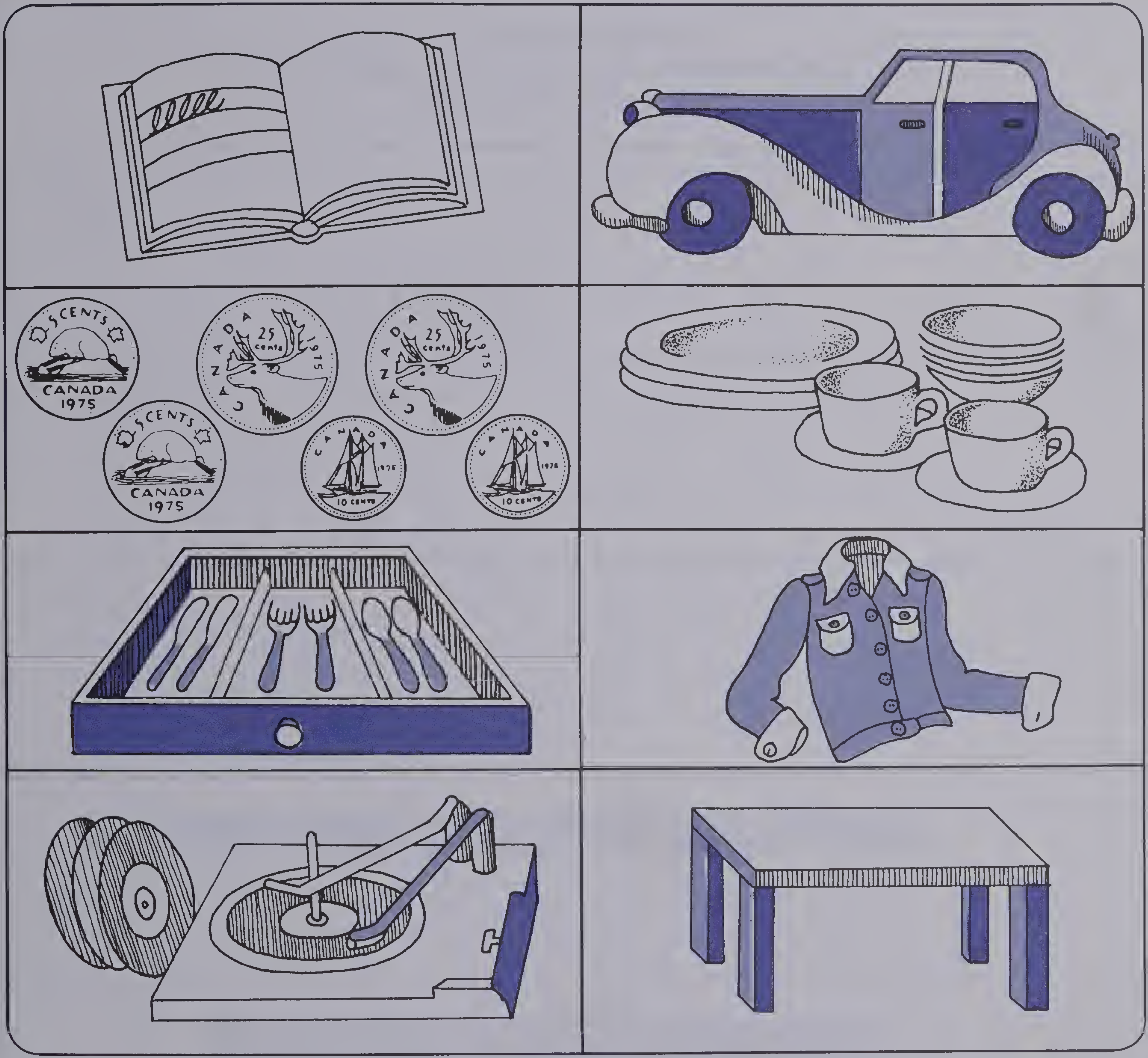
Look at windows in buildings in your neighbourhood.
Why are many of the windows in a building congruent?

Why are handles
on a dresser
the same size and shape?



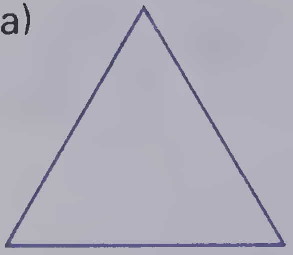
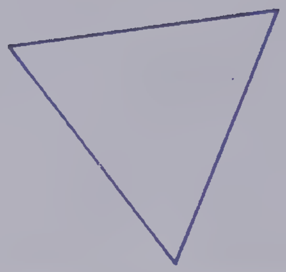
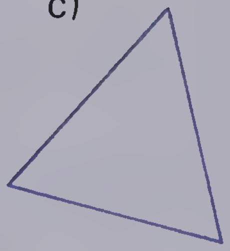
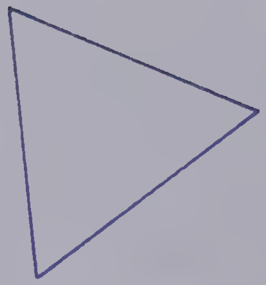
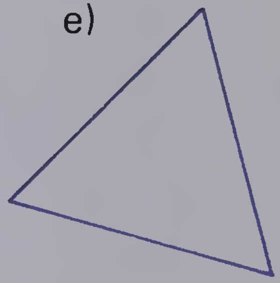
IN ACTION

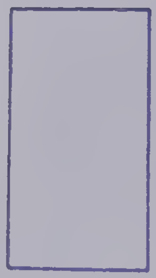
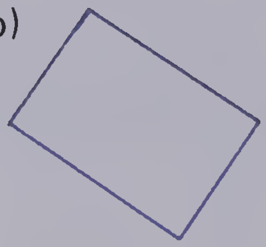
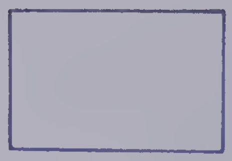
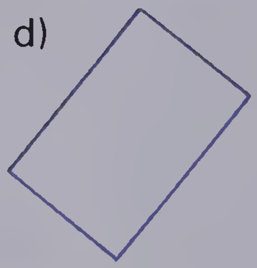
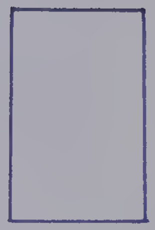
1. Make a list of congruent objects that you use often. For each thing you list, think about why congruency is important.

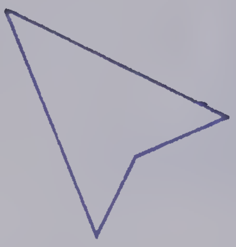
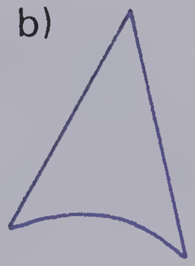
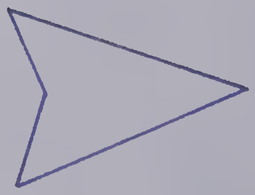
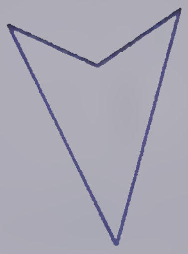
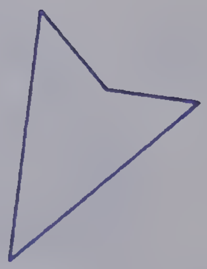

5 CENTS
CANADA
1975
25 cents
CANADA
1975
10 CENTS

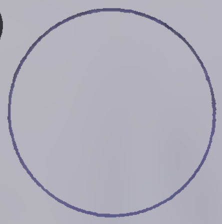
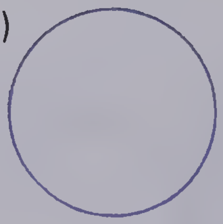
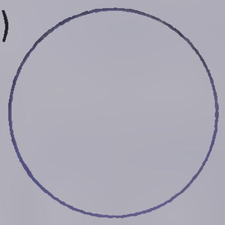
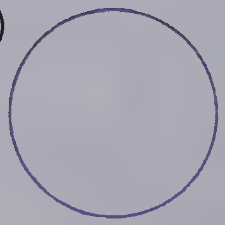
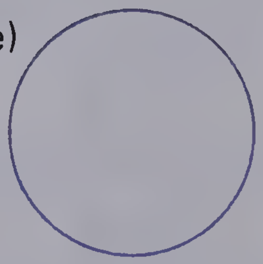
2. For each picture,
list some examples of congruency.
Why is congruency important in each example?

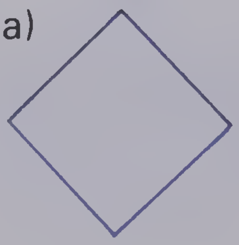
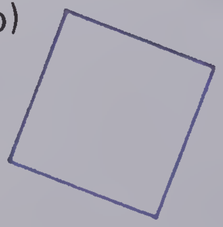
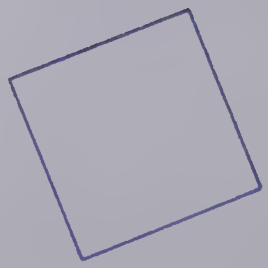
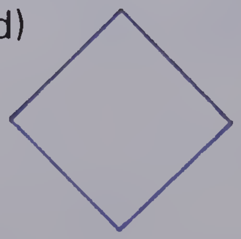
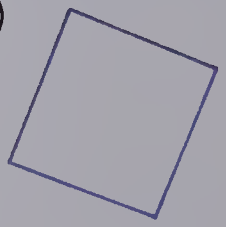
3. Look at each row.
Which figure in each row is not congruent to the other figures?
Check by using tracing paper.

a) 
b) 
c) 
d) 
e) 

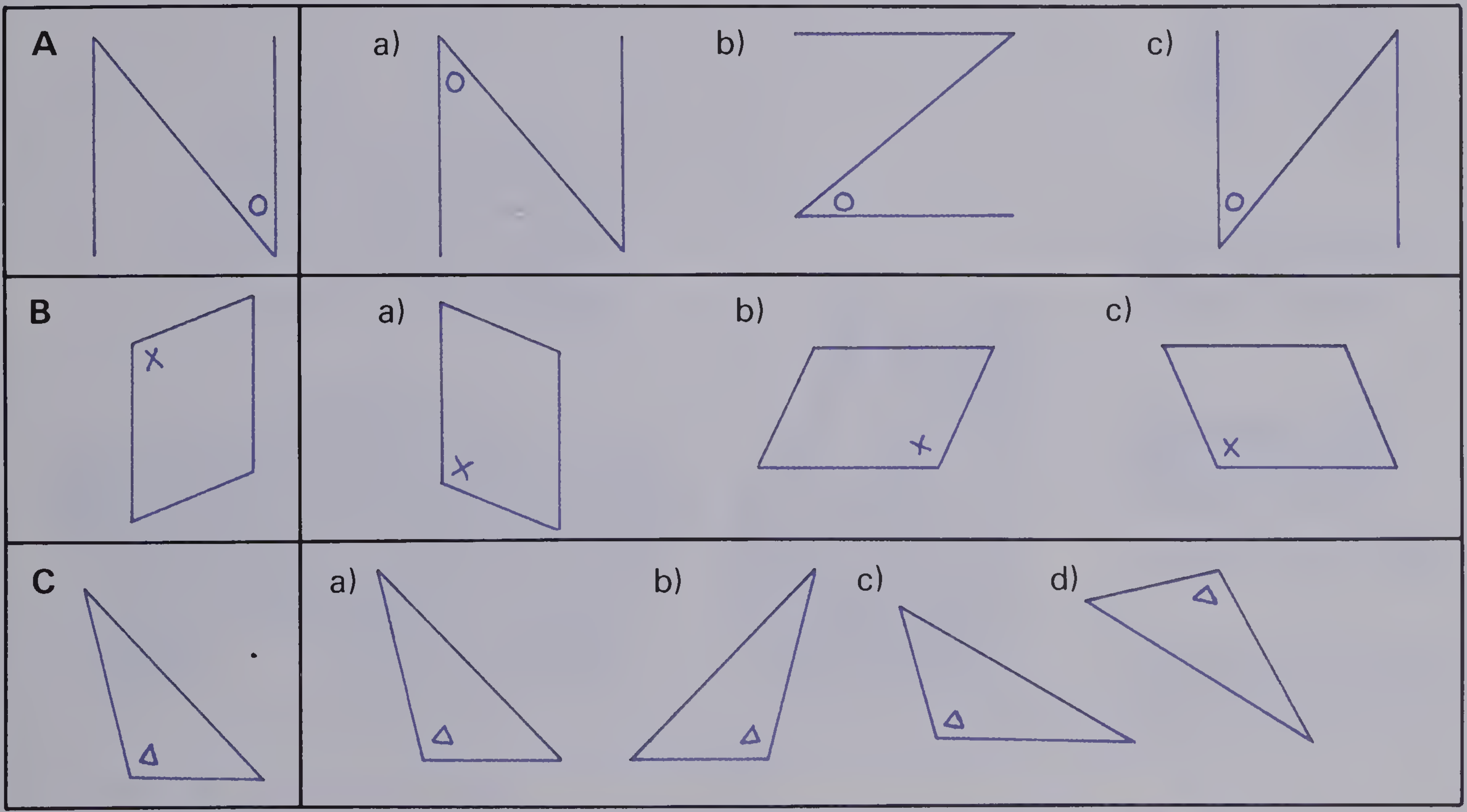
a) 
b) 
c) 
d) 
e) 

a) 
b) 
c) 
d) 
e) 

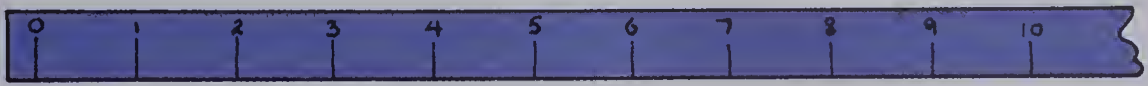
a) 
b) 
c) 
d) 
e) 

a) 
b) 
c) 
d) 
e) 

4. Use tracing paper to
show that each figure is congruent to
the first figure in each row.

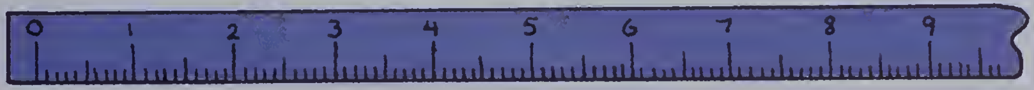

A
a)
b)
c)
B
a)
b)
c)
C
a)
b)
c)
d)

5. a)


0
1
2
3
4
5
6
7
8
9
10

Look at your ruler. Each centimetre unit
is congruent to every other centimetre unit.
Why is that important?

b)


0
1
2
3
4
5
6
7
8
9

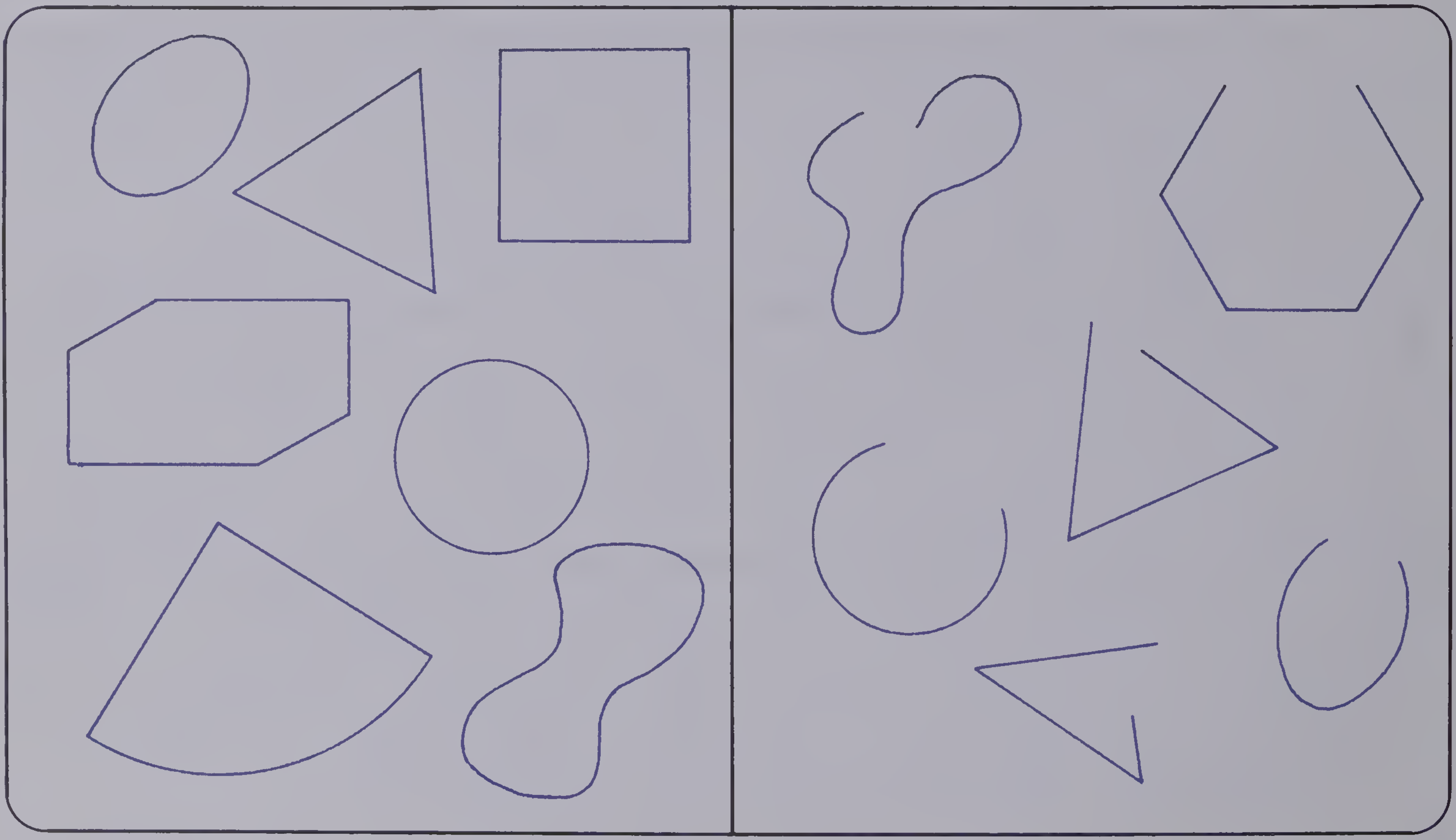
Each millimetre unit
is congruent to every other millimetre unit.
Why is that important?

EXPLORE

GEOMETRIC CURVES/ Simple Closed Curves / Open Curves

Each of these figures can be called a **simple closed curve.**

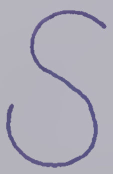
Each of these figures can be called an **open curve.**



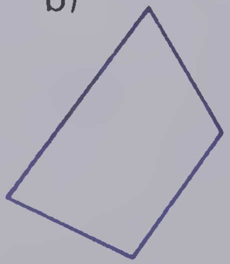
How is a simple closed curve different from an open curve?

Which of these figures are simple closed curves and which are open curves?

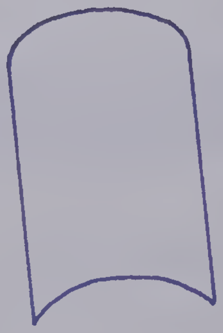
a)



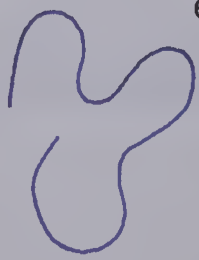
b)



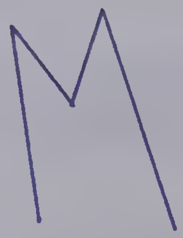
c)



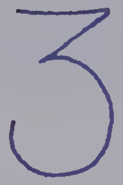
d)



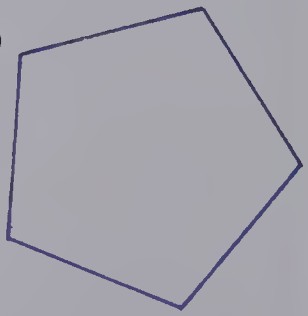
e)



f)



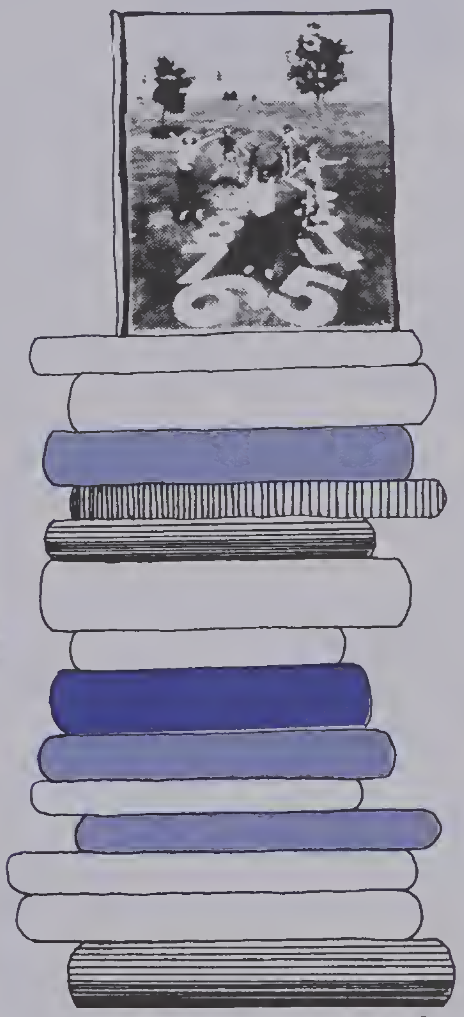
g)



Naming Figures

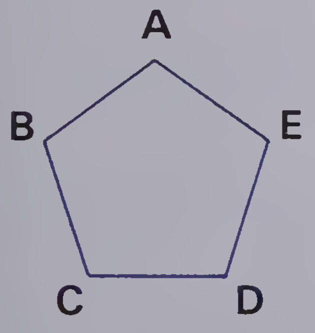
PEOPLE HAVE NAMES.

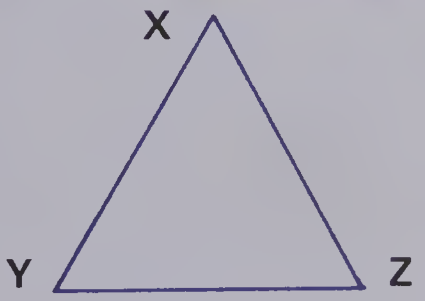
ANIMALS HAVE NAMES.



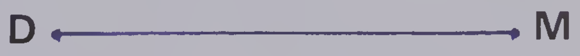
BOOKS HAVE NAMES.

We can name geometric figures.
We use capital letters.
We call this pentagon ABCDE.

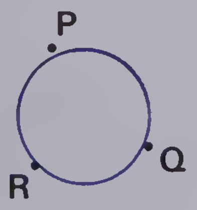




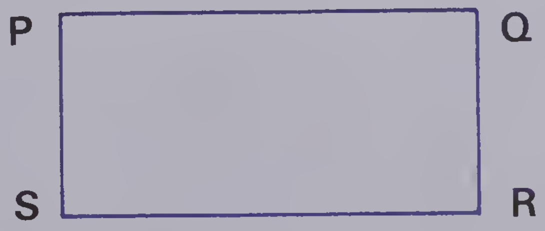
This is triangle XYZ.



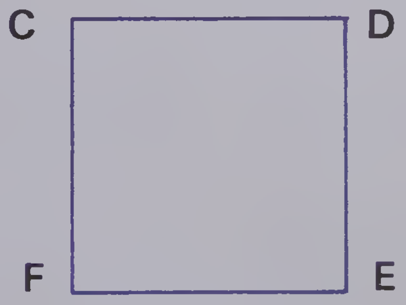
This is line segment DM.



We call this circle PQR.



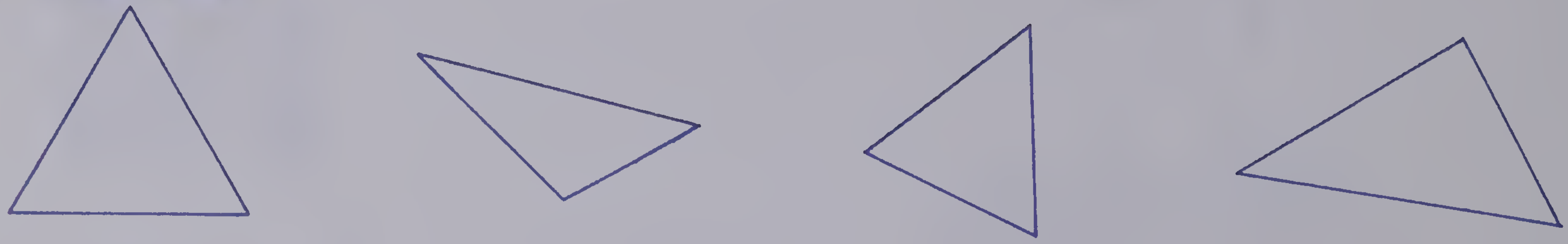
What is the name of
this rectangle?



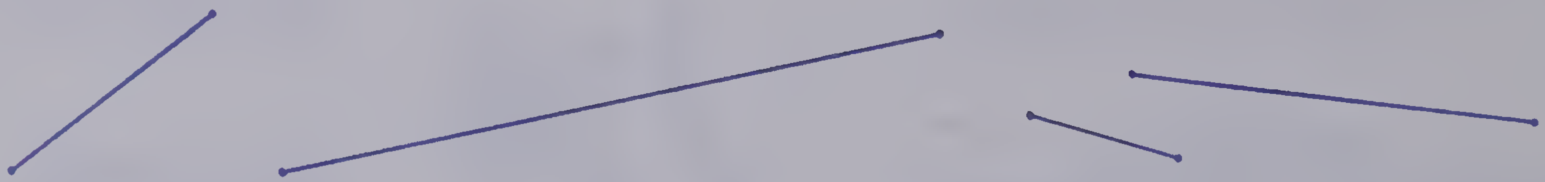
What is the name of
this square?

IN ACTION

1. Trace and use capital letters to name each triangle.

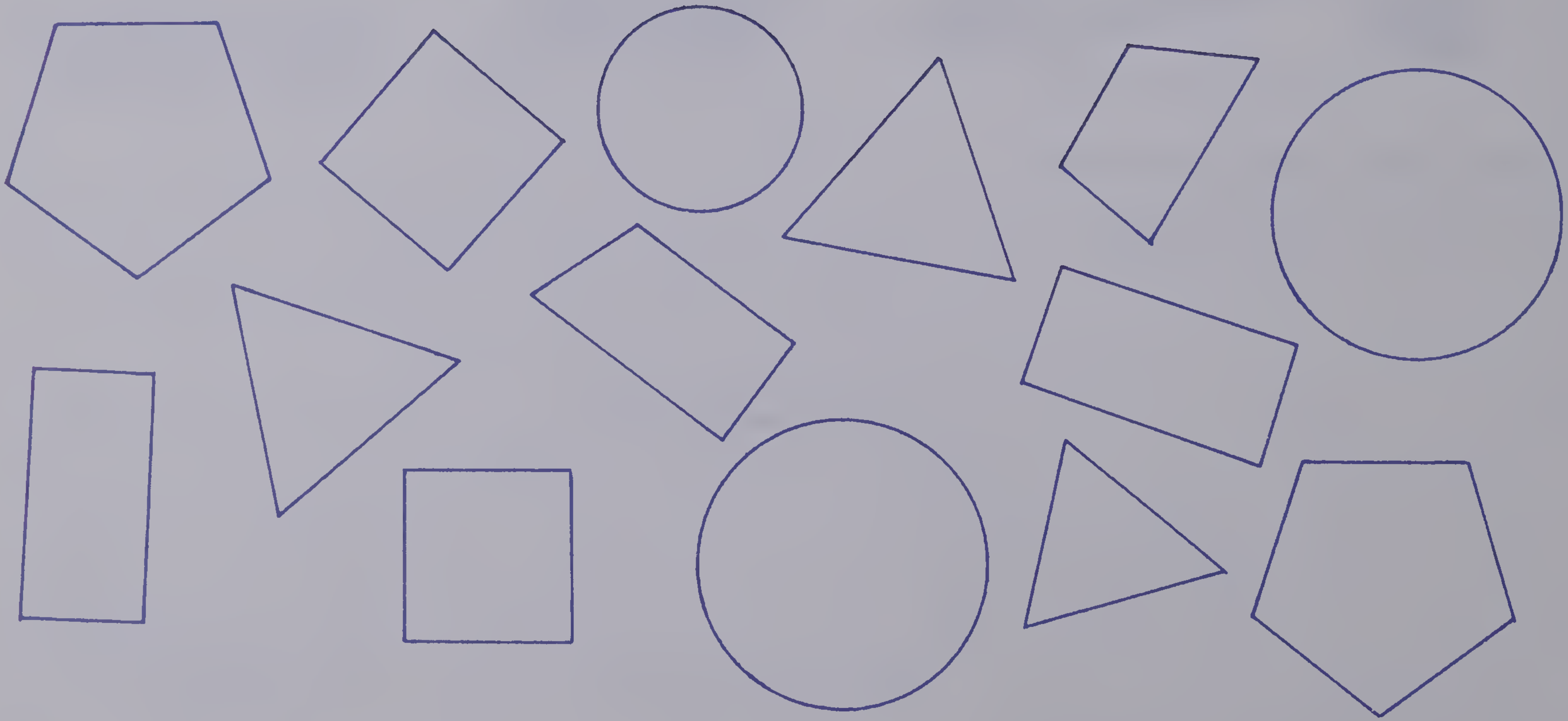


2. Trace and name each line segment.



3. Draw and name 3 rectangles.

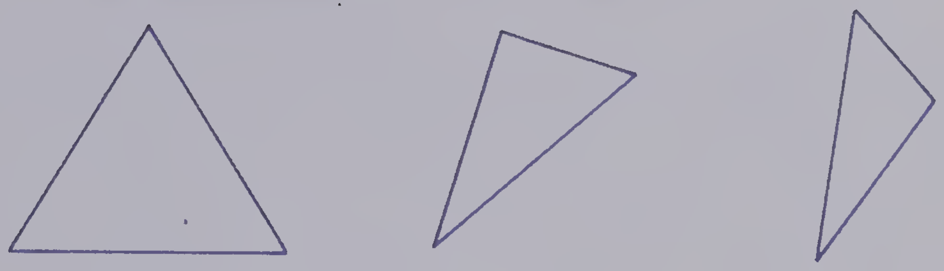
4. Trace and use capital letters to name congruent figures.



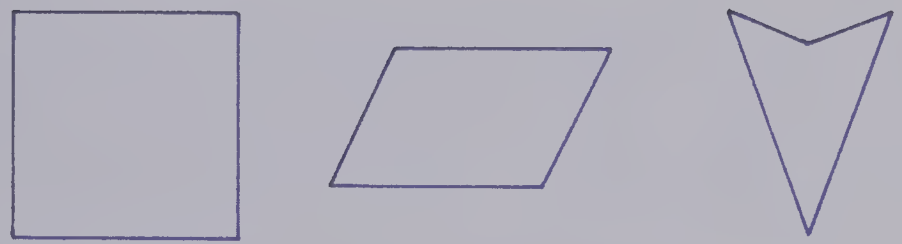
Polygons

Simple closed curves made of line segments
are called **polygons.**

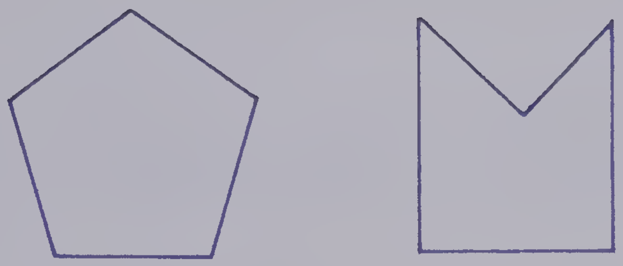
Polygons can have
3 sides,



or 4 sides,

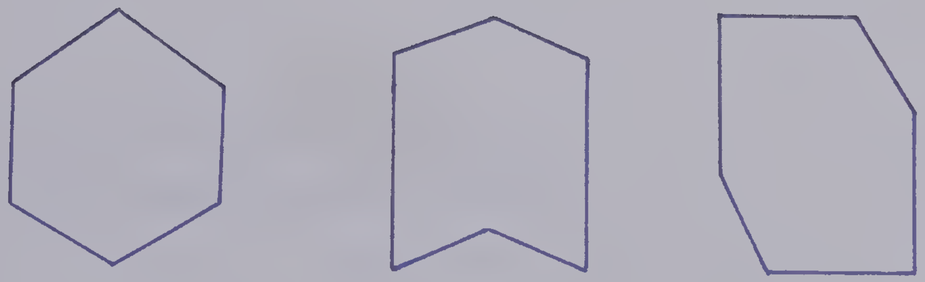


or 5 sides,

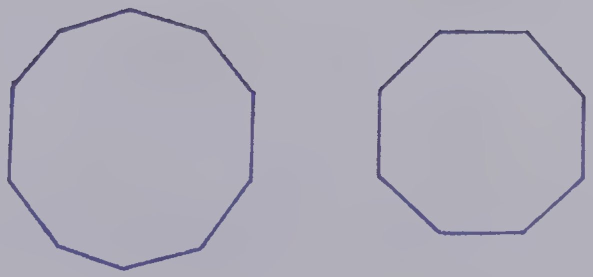


or 6 sides,

or any number of sides.



How many sides
has each of these polygons?

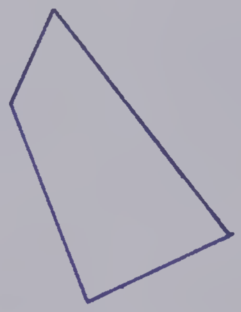


Quadrilaterals

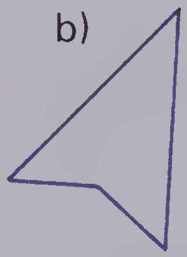
Polygons with 4 sides are called **quadrilaterals.**

Which of the following figures are quadrilaterals?
Trace and name them.

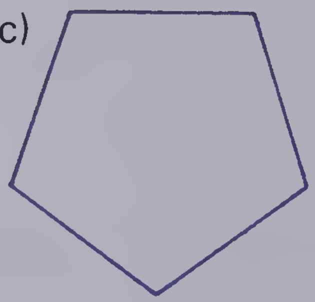
a)



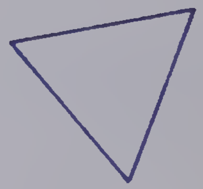
b)



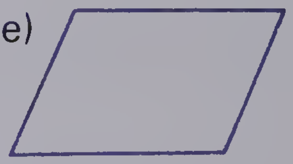
c)



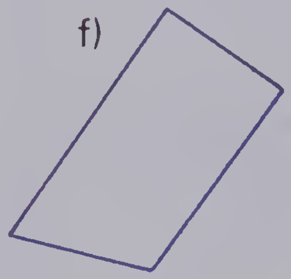
d)



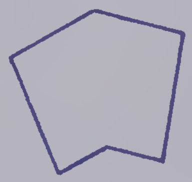
e)



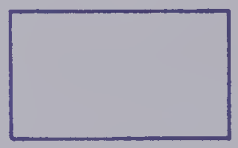
f)



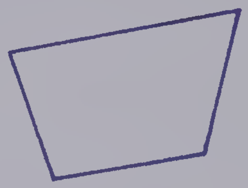
g)



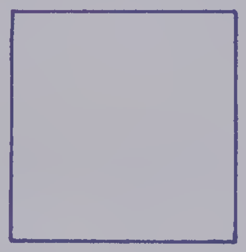
h)



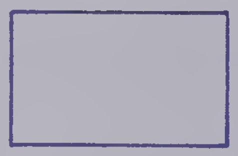
i)



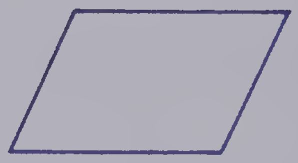
There are many different kinds of quadrilaterals.



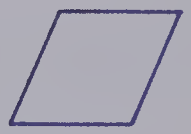
square



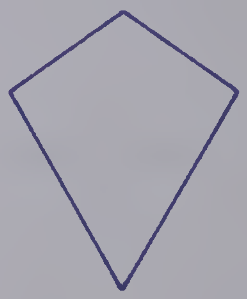
rectangle



parallelogram

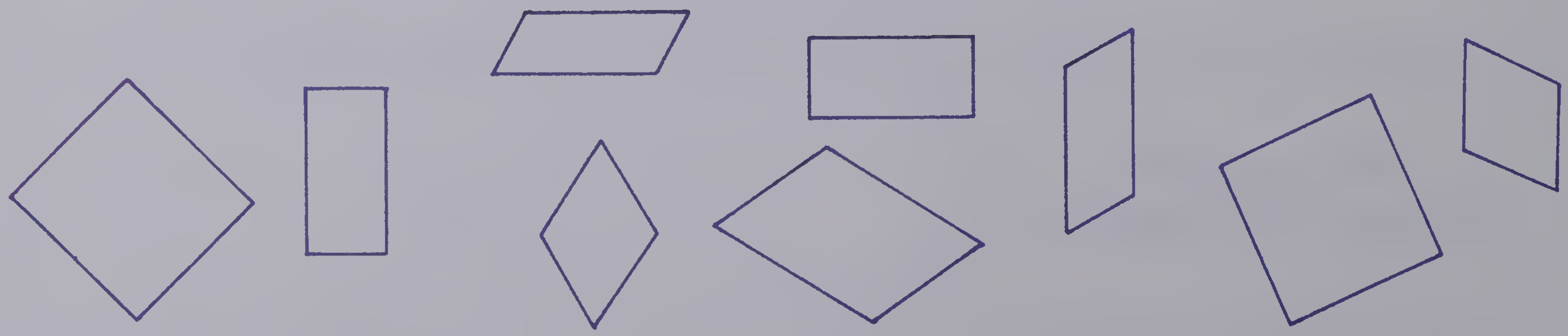


rhombus



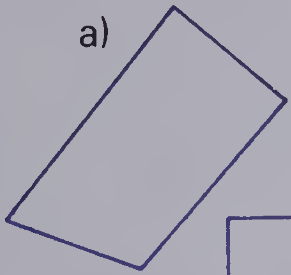
kite

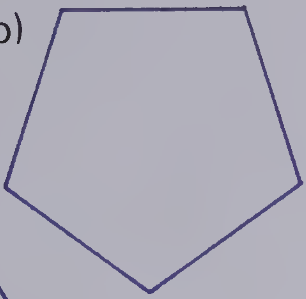
Trace and use capital letters
to name congruent quadrilaterals.
What kind of quadrilateral is each one?

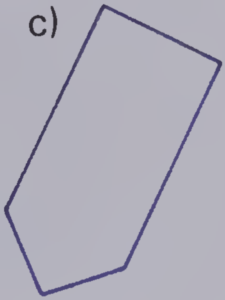


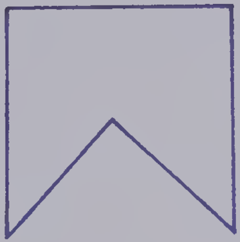
Pentagons and Hexagons

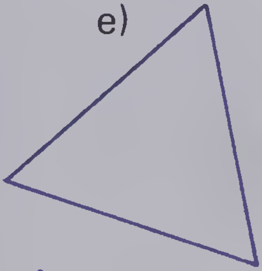
Polygons with 5 sides are called **pentagons.**
Which of the following figures are pentagons?

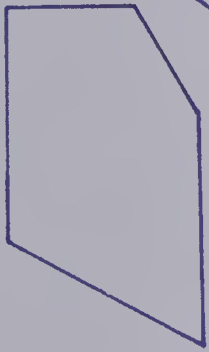
a)


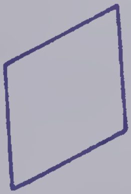
b)


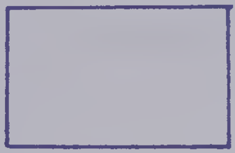
c)


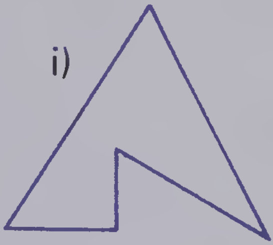
d)


e)


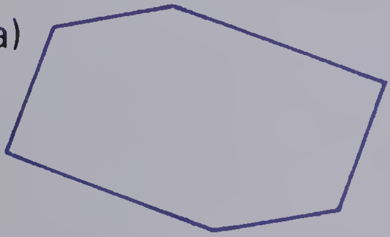
f)


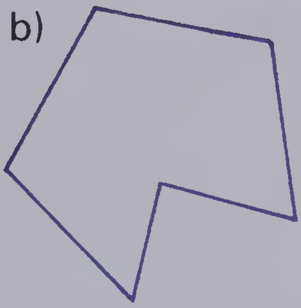
g)


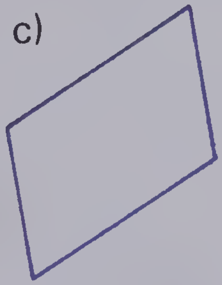
h)


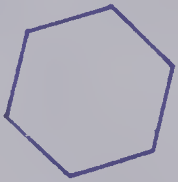
i)


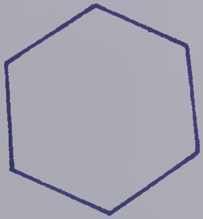
Polygons with 6 sides are called **hexagons.**
Which of the following figures are hexagons?

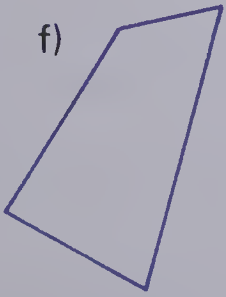
a)


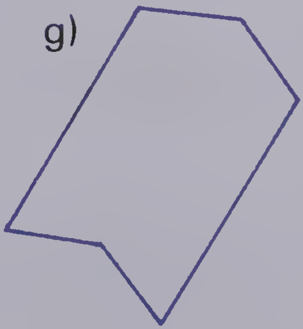
b)


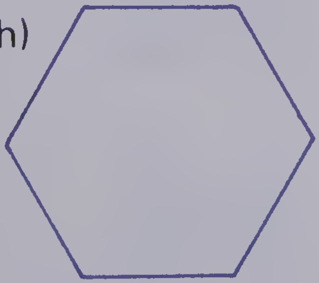
c)


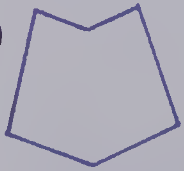
d)


e)


f)


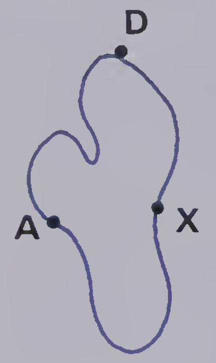
g)


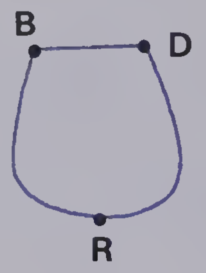
h)


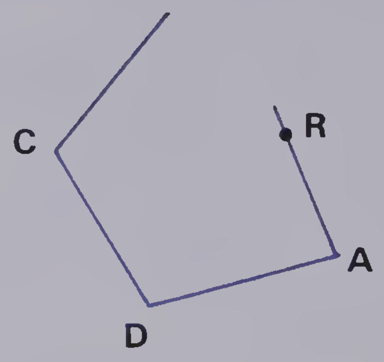
i)


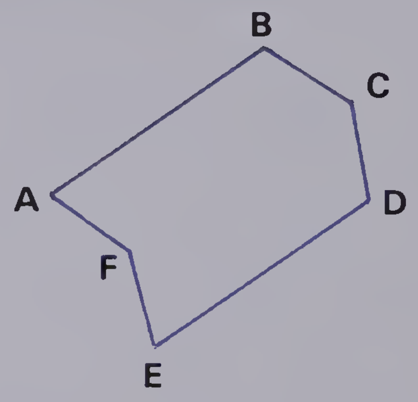
IN ACTION

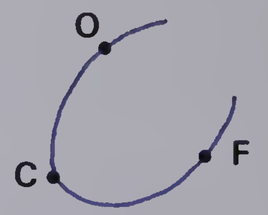
1. Which of these figures are simple closed curves and which are open curves?

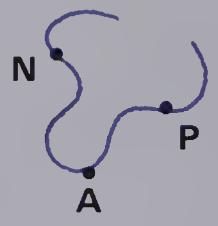




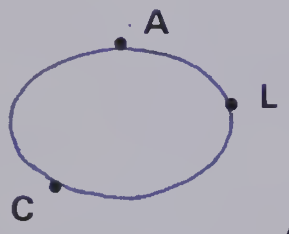


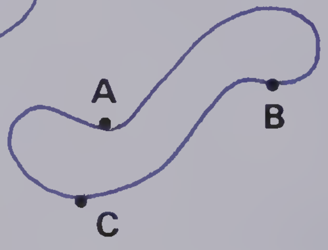


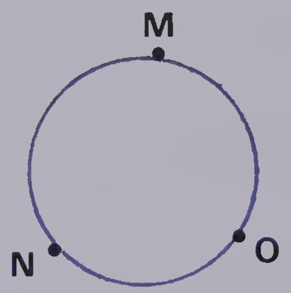


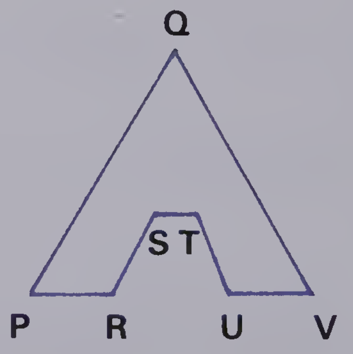


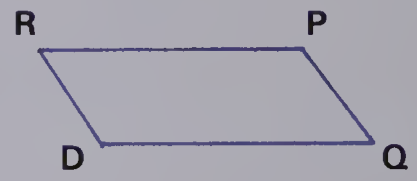
2. Which of these figures are not polygons?

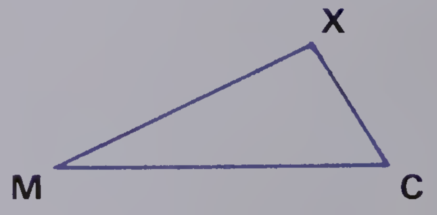




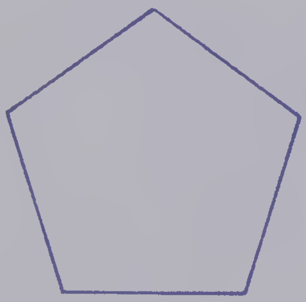


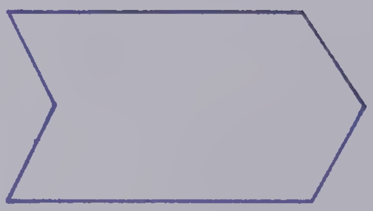


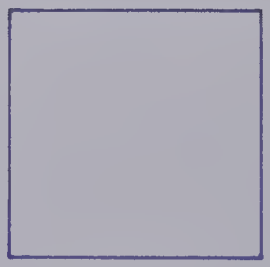


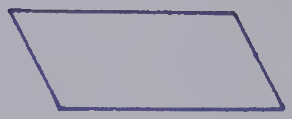


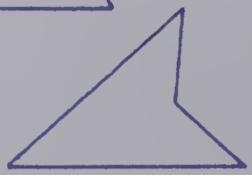
3. Trace each figure. Use capital letters to name each one. Tell what kind of polygon each figure is.

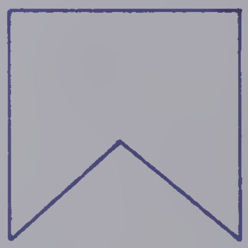


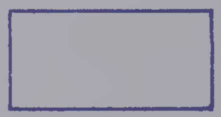




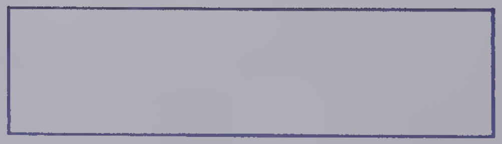








4. This is a rectangle. The opposite sides are congruent.



Draw 2 different quadrilaterals with congruent opposite sides.
Use capital letters to name the figures and tell what kind of quadrilateral each figure is.

MULTIPLICATION AND DIVISION/ Multiplication

X	0	1	2	3	4	5	6	7	8	9	10
0	**0**	0	0	0	0	0	0	0	0	0	0
1	0	**1**	2	3	4	5	6	7	8	9	10
2	0	2	**4**	6	8	10	12	14	16	18	20
3	0	3	6	**9**	12	15	18	21	24	27	30
4	0	4	8	12	**16**	20	24	28	32	36	40
5	0	5	10	15	20	**25**	30	35	40	45	50
6	0	6	12	18	24	30	**36**	42	48	54	60
7	0	7	14	21	28	35	42	**49**	56	63	70
8	0	8	16	24	32	40	48	56	**64**	72	80
9	0	9	18	27	36	45	54	63	72	**81**	90
10	0	10	20	30	40	50	60	70	80	90	**100**

← centre diagonal

Although the chart shows 121 multiplication facts, there aren't really many to learn. Why?

1) The upper half of the chart is the same as the lower half.

$$8 \times 4 = 4 \times 8$$

You need to study only the centre diagonal and one side of it.

→ **66** facts left

2) If 0 is a factor, then the product is 0.

$$\underset{\text{factor}}{6} \times \underset{\text{factor}}{0} = \underset{\text{product}}{0}$$

You can take out the first column.

→ **55** facts left

3) If 1 is a factor, then the product is the number itself.
8 × 1 = 8
You can take out the second column.

45 facts left

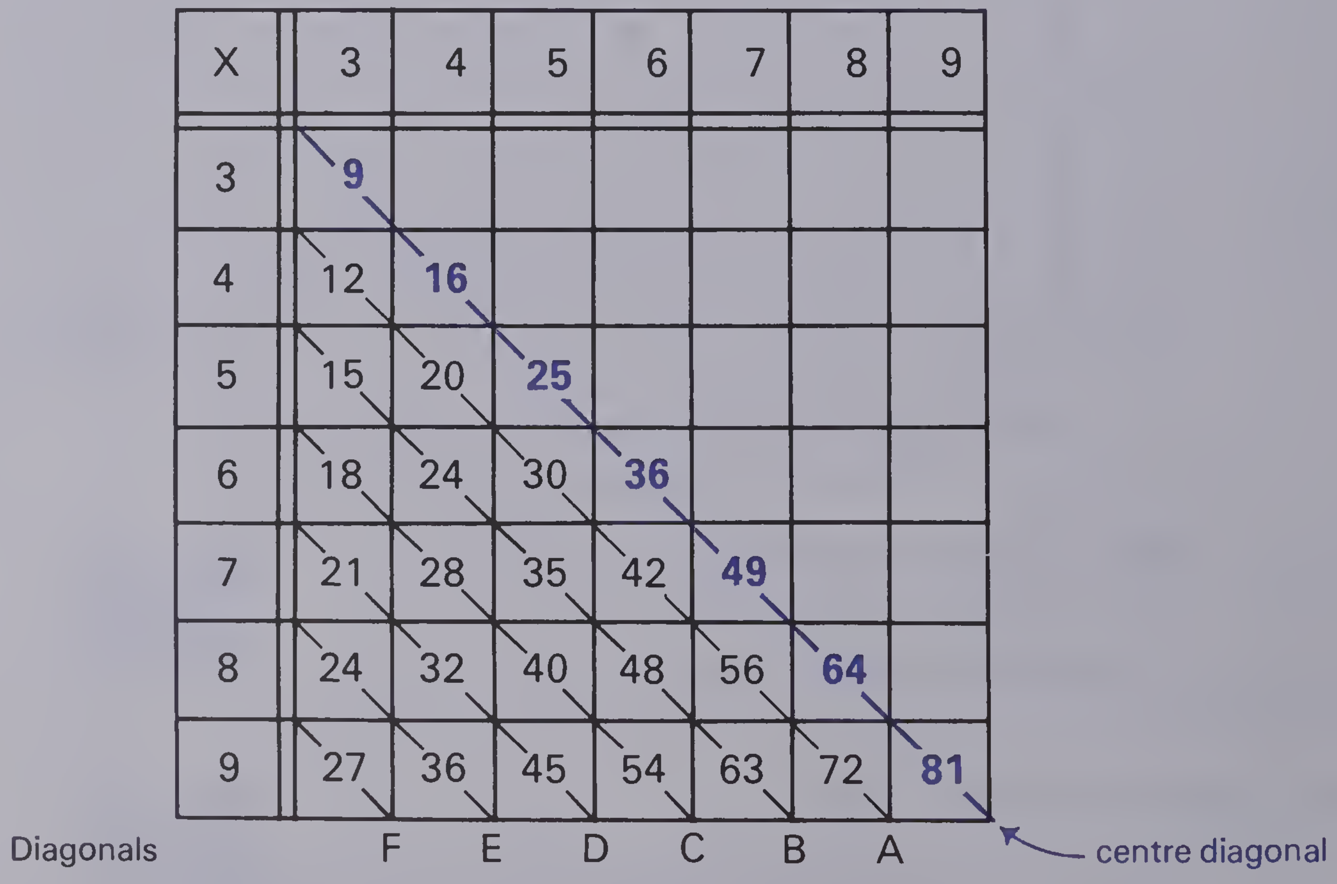
4) If 10 is a factor, you just write the number and put a zero after it.
10 × 8 = 80
You can take out the last row.

36 facts left

5) If 2 is a factor, just double the number.
7 × 2 = 14
You could master that column quickly.

28 facts left

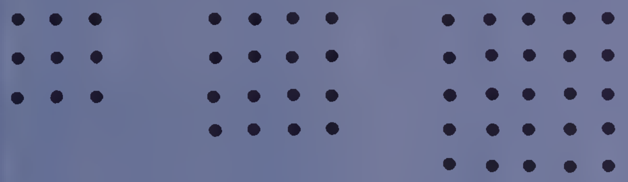
Now look at the chart again.


Diagonals
F
E
D
C
B
A
centre diagonal

X	3	4	5	6	7	8	9
3	**9**						
4	12	**16**					
5	15	20	**25**				
6	18	24	30	**36**			
7	21	28	35	42	**49**		
8	24	32	40	48	56	**64**	
9	27	36	45	54	63	72	**81**

Memorize the facts by studying 1 diagonal at a time.

The centre diagonal shows **square numbers.**
Is this a good name?



9, 16, 25, 36, 49, 64, 81

Here are the number pairs.
(3,3); (4,4); (5,5); (6,6); (7,7); (8,8); (9,9)
LEARN 7 FACTS

Diagonal A
(4,3); (5,4); (6,5); (7,6); (8,7); (9,8)
LEARN 6 FACTS

Diagonal B
(5,3); (6,4); (7,5); (8,6); (9,7)
LEARN 5 FACTS

Diagonal C
(6,3); (7,4); (8,5); (9,6)
LEARN 4 FACTS

Diagonal D
(7,3); (8,4); (9,5)
LEARN 3 FACTS

Diagonal E
(8,3); (9,4)
LEARN 2 FACTS

Diagonal F
(9,3)
LEARN 1 FACT

ONLY 28 FACTS

You can master these.

IN ACTION

1. Complete the charts by multiplying.

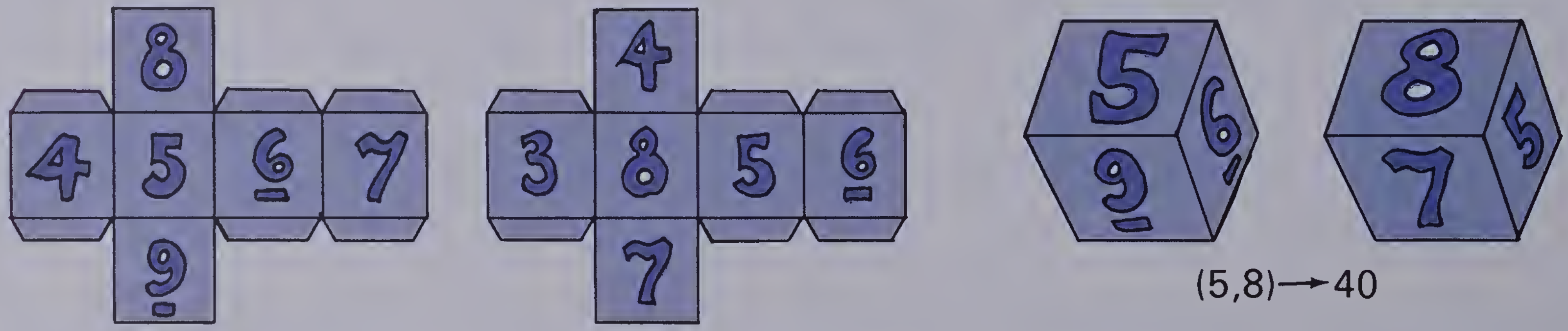
Number Pair	Product
(4,7)	
(5,6)	
(3,4)	
(6,7)	
(9,3)	
(5,5)	

Number Pair	Product
(7,7)	
(6,9)	
(4,8)	
(7,8)	
(3,6)	
(4,4)	

Number Pair	Product
(7,9)	
(9,5)	
(8,5)	
(6,8)	
(6,6)	
(9,8)	

Number Pair	Product
(8,8)	
(7,10)	
(8,7)	
(8,9)	
(9,9)	
(9,6)	

2. Here are the patterns for 2 dice. Write 15 number pairs you could roll with these dice and the product for each pair. One possible play is shown.



(5,8)→40

How many number pairs do you think are possible?

3. For each product, write 2 multiplication number pairs.
Remember, (7,8) and (8,7) are 2 number pairs with the same product, 56.

a) 24 b) 32 c) 63 d) 72 e) 20 f) 18

For which products can you write more than 2 number pairs? Record these number pairs.

4. Use all the rows each time,
but a different number of columns.
Write the number pairs and products.

For 2 columns, (5,2)→10

× × × × × × × × ×
× × × × × × × × ×
× × × × × × × × ×
× × × × × × × × ×
× × × × × × × × ×

Division

Use the multiplication chart on page 28.
For each multiplication sentence,
there are corresponding division sentences.

$8 \times 9 = 72,\quad 72 \div 9 = 8$
$72 \div 8 = 9$

$7 \times 7 = 49,\quad 49 \div 7 = 7$

For each multiplication number pair,
there is a division number pair.

Number Pair	**Product**
(8,9)	72

Number Pair	**Quotient**
(72,9)	8

IN ACTION

1. Use the chart on page 28. Write and learn the division facts diagonal by diagonal.

2. Complete the charts.

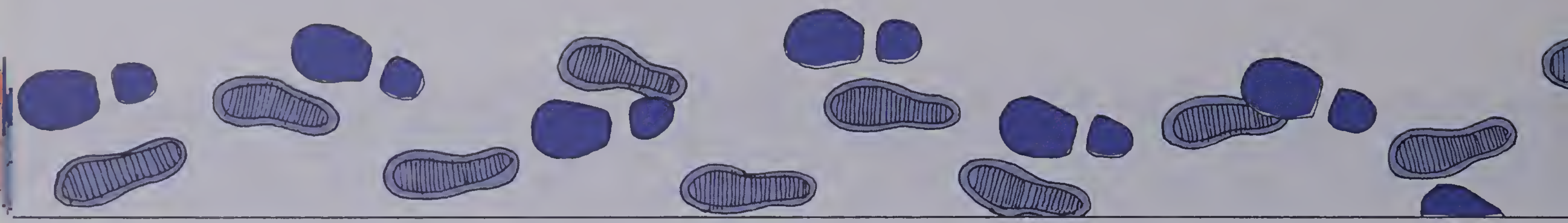
Number Pair	Quotient
(21,3)	
(25,5)	
(18,3)	
(16,2)	
(32,4)	
(12,3)	

Number Pair	Quotient
(28,4)	
(35,5)	
(42,7)	
(48,8)	
(56,7)	
(18,2)	

Number Pair	Quotient
(50,10)	
(63,7)	
(72,9)	
(64,8)	
(49,7)	
(80,10)	

Number Pair	Quotient
(54,6)	
(81,9)	
(72,8)	
(48,6)	
(63,9)	
(90,10)	

3. Think of a 1-digit number. Multiply by 9. Add twice the original number. Divide by the number. Subtract 11. What is your answer? Repeat the problem using a different 1-digit number.



Retrace Your Steps

1. Solve.
   a) $k + 7 = 15$ b) $p - 9 = 8$ c) $m - 3 = 9$ d) $n + 7 = 16$ e) $q - 6 = 7$

2. Solve.
   a) $4 \times p = 32$ b) $6 \times m = 42$ c) $7 \times n = 56$ d) $8 \times y = 72$ e) $5 \times k = 45$

3. Solve.
   a) $49 \div m = 7$ b) $64 \div n = 8$ c) $p \div 8 = 7$ d) $y \div 8 = 9$ e) $k \div 9 = 81$

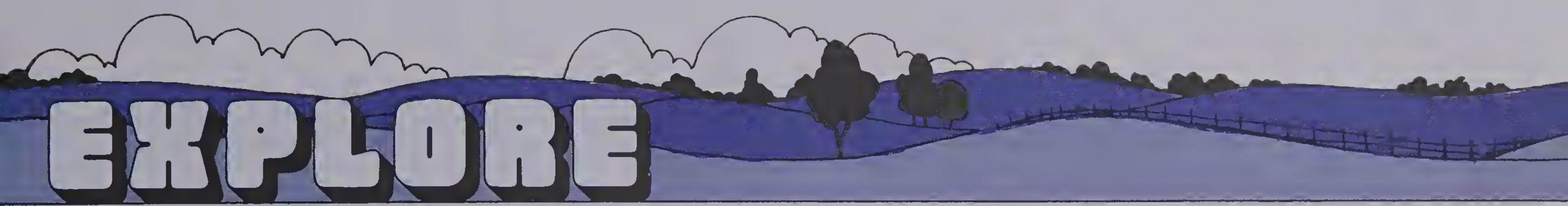
4. Complete the chart.

k	Odd (O) or Even (E)?	$2 \times k + 1$	O or E?	$2 \times k - 1$	O or E?
2				3	O
3					
		9			
				9	
7					
				15	

5. Multiply.
   a) (8, 10) b) (0.4, 10) c) (1.7, 10) d) (18, 10)
   e) (2.14, 10) f) (14.01, 10) g) (6,100) h) (2.8, 100)
   i) (0.3, 100) j) (0.16, 100) k) (19.19, 100) l) (4.08, 100)
   m) (4, 1000) n) (1.3, 1000) o) (13, 1000) p) (0.99, 1000)
   q) (2.22, 1000) r) (0.01, 1000) s) (0.54, 1000) t) (3.76, 1000)

6. Divide.
   a) (80, 10) b) (17, 10) c) (8, 10) d) (0.6, 10)
   e) (3.5, 10) f) (17.6, 10) g) (400, 100) h) (6.75, 100)
   i) (3, 100) j) (1, 100) k) (11, 100) l) (111, 100)
   m) (3000, 1000) n) (400, 1000) o) (650, 1000) p) (9500, 1000)
   q) (11 000,1000) r) (140, 1000) s) (540, 1000) t) (3980, 1000)

7. Multiply.
   a) 47 by 8 b) 86 by 9 c) 2.8 by 4 d) 5.8 by 6 e) 8.7 by 9
   f) 543 by 4 g) 63.9 by 5 h) 354 by 8 i) 79.3 by 7 j) 94.8 by 6



REPRESENTING A NUMBER/Letter Symbols

Letter symbols are used to represent numbers in number sentences.

$n + 9 = 17$ A number add 9 is 17.
$n = 8$ The number is 8.

$3 \times k = 15$ 3 times a number is 15.
$k = 5$ The number is 5.

Finding the number represented by a letter in a sentence is called solving an equation.

Solve. $p \div 8 = 9$ A number divided by 8 is 9.
$p = 72$ The number is 72.

IN ACTION

1. The letter in each sentence represents a number. Give the meaning of each sentence.
a) $y + 8 = 15$ b) $k - 6 = 12$ c) $9 \times n = 63$ d) $w \div 6 = 8$

2. Solve.
a) $k + 6 = 15$ b) $w + 9 = 21$ c) $y + 8 = 17$ d) $n + 11 = 26$ e) $p + 12 = 30$

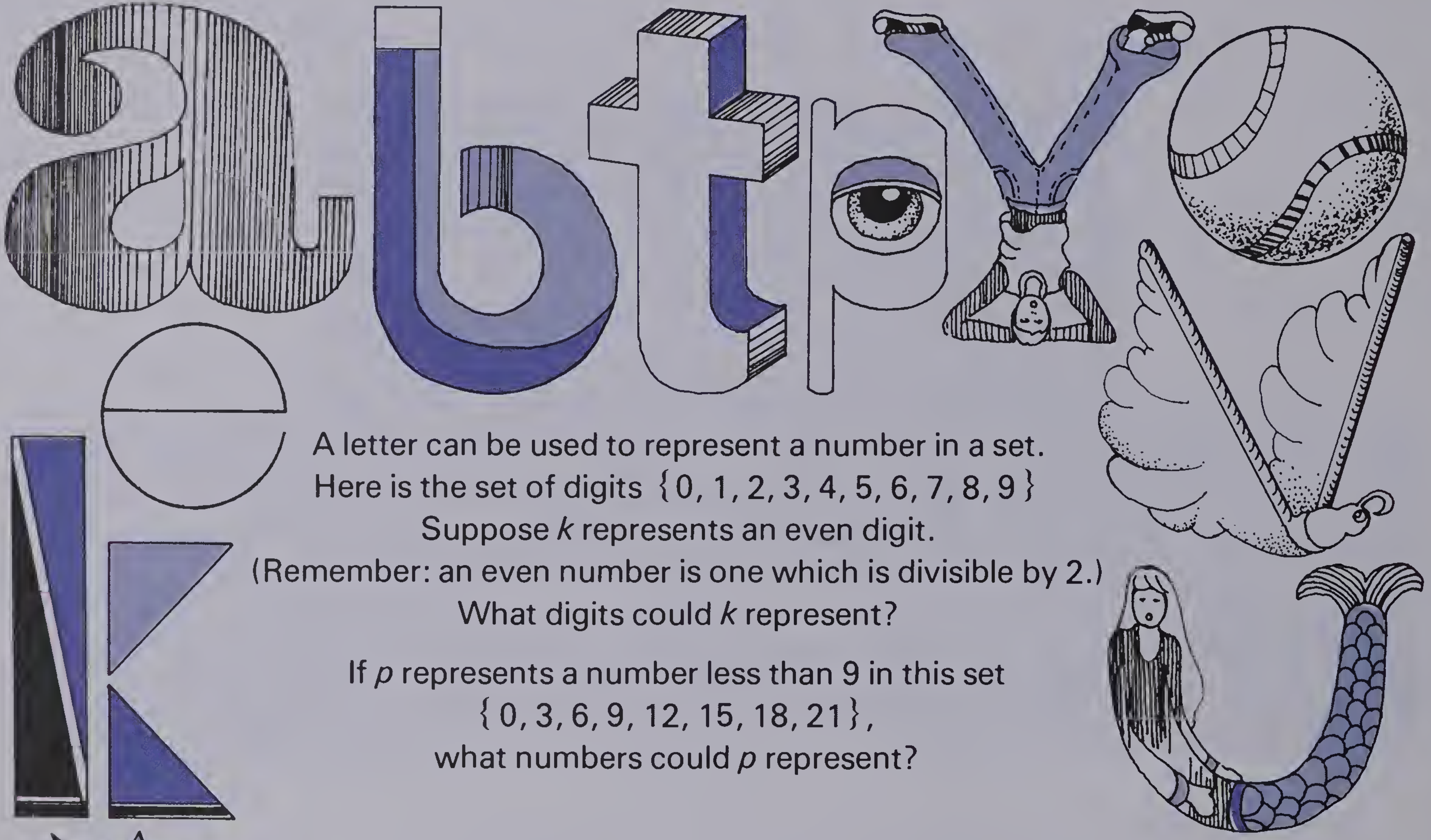
3. Solve.
a) $p - 9 = 15$ b) $k - 5 = 14$ c) $m - 8 = 13$ d) $q - 7 = 18$ e) $m - 10 = 27$

4. Solve.
a) $4 \times p = 36$ b) $5 \times n = 40$ c) $6 \times e = 48$ d) $7 \times m = 63$ e) $9 \times n = 72$

5. Solve.
a) $g \div 7 = 9$ b) $p \div 8 = 5$ c) $m \div 9 = 6$ d) $d \div 6 = 7$ e) $w \div 5 = 8$

6. Solve.
a) $c - 9 = 14$ b) $h + 16 = 40$ c) $6 \times y = 54$ d) $f \div 7 = 7$ e) $8 \times w = 64$

Letter Symbols



A letter can be used to represent a number in a set.
Here is the set of digits $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$
Suppose k represents an even digit.
(Remember: an even number is one which is divisible by 2.)
What digits could k represent?

If p represents a number less than 9 in this set
$\{0, 3, 6, 9, 12, 15, 18, 21\}$,
what numbers could p represent?

IN ACTION

1. n is greater than 12. What numbers in the set $\{0, 4, 8, 12, 16, 20, 24, 28, 32\}$ could n represent?

2. Complete the chart.

n	$2 \times n$	$2 \times n + 1$	$4 \times n$	$8 \times n \div 4$	$2 \times n - 1$
5		11		10	
7					
	16				
			36		
		17			
					13
3					
10					

3. Let k represent a 3-digit number.
   a) For the set of digits $\{6, 5, 8, 9\}$, what are the possible values of k? Use each digit only once.
   b) What is the largest number k could represent?
   c) Sort your set of 3-digit numbers into even and odd numbers.

EXPLORE

MULTIPLICATION AND DIVISION/Multiples of 10

To multiply 70 by 4, you could think

$$\begin{aligned} 4 \times 70 &= 4 \times 7 \times 10 \\ &= 28 \times 10 \\ &= 280 \end{aligned}$$

Since $4 \times 70 = 280$, then $280 \div 70 = 4$ and $280 \div 4 = 70$

In the same way,

$$\begin{aligned} 40 \times 70 &= 4 \times 10 \times 7 \times 10 \\ &= 4 \times 7 \times 10 \times 10 \\ &= 28 \times 100 \\ &= 2800 \end{aligned}$$

Since $40 \times 70 = 2800$, then $2800 \div 70 = 40$ and $2800 \div 40 = 70$

IN ACTION

1. Complete.

a) $3 \times 50 = ?$ $30 \times 50 = ?$
b) $5 \times 40 = ?$ $50 \times 40 = ?$
c) $6 \times 70 = ?$ $60 \times 70 = ?$
d) $7 \times 80 = ?$ $70 \times 80 = ?$
e) $8 \times 90 = ?$ $80 \times 90 = ?$

2. What is the product?

a) 20×40
b) 30×60
c) 40×50
d) 60×80
e) 50×90
f) 30×80

3. Complete.

a) $150 \div 3 = ?$ $150 \div 30 = ?$ $1500 \div 30 = ?$
b) $240 \div 6 = ?$ $240 \div 60 = ?$ $2400 \div 60 = ?$
c) $420 \div 7 = ?$ $420 \div 70 = ?$ $4200 \div 70 = ?$
d) $560 \div 8 = ?$ $560 \div 80 = ?$ $5600 \div 80 = ?$
e) $720 \div 9 = ?$ $720 \div 90 = ?$ $7200 \div 90 = ?$

4. Complete.

a) $30 \times 50 = ?$ $1500 \div 50 = ?$ $1500 \div 30 = ?$
b) $40 \times 60 = ?$ $? \div 60 = 40$ $? \div ? = 60$
c) $60 \times 80 = ?$ $? \div ? = 60$ $? \div ? = 80$
d) $70 \times 90 = ?$ $? \div ? = 90$ $? \div ? = 70$
e) $40 \times 90 = ?$ $? \div ? = 90$ $? \div ? = 40$

5. Solve.

a) $k = 60 \times 80$
b) $p = 6400 \div 80$
c) $n = 90 \times 80$
d) $w = 70 \times 70$
e) $y = 6300 \div 90$

Multiplying by 10

What is your rule for multiplying by 10? Study the patterns.

9 × 1 = 9	19 × 1 = 19	0.9 × 1 = 0.9	0.19 × 1 = 0.19	9.19 × 1 = 9.19
9 × 10 = 90	19 × 10 = 190	0.9 × 10 = 9	0.19 × 10 = 1.9	9.19 × 10 = 91.9
90 × 10 = 900	190 × 10 = 1900	1.9 × 10 = 19	1.19 × 10 = 11.9	19.19 × 10 = 191.9

IN ACTION

1. Complete.

a)	b)	c)	d)	e)
7 × 1 = ?	15 × 1 = ?	0.6 × 1 = ?	0.14 × 1 = ?	8.17 × 1 = ?
7 × 10 = ?	15 × 10 = ?	0.6 × 10 = ?	0.14 × 10 = ?	8.17 × 10 = ?
70 × 10 = ?	150 × 10 = ?	1.6 × 10 = ?	1.14 × 10 = ?	18.17 × 10 = ?

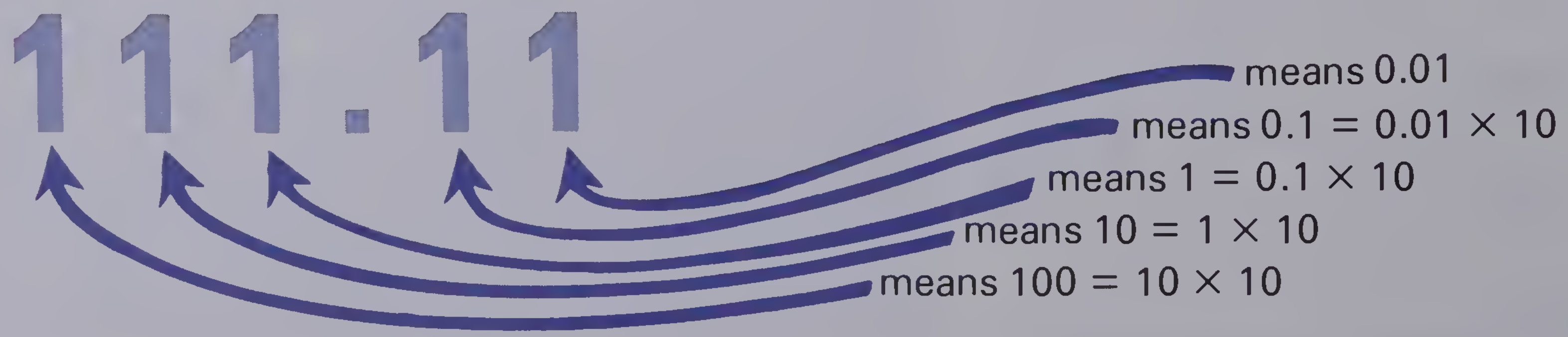
2. Write the products.

a) 0.4 × 10 b) 1.9 × 10 c) 6.04 × 10 d) 9.15 × 10
e) 14.5 × 10 f) 35.6 × 10 g) 73.24 × 10 h) 97.28 × 10
i) 1.01 × 10 j) 1.11 × 10 k) 147 × 10 l) 264.2 × 10
m) 359.04 × 10 n) 286.75 × 10 o) 654.01 × 10 p) 394.26 × 10

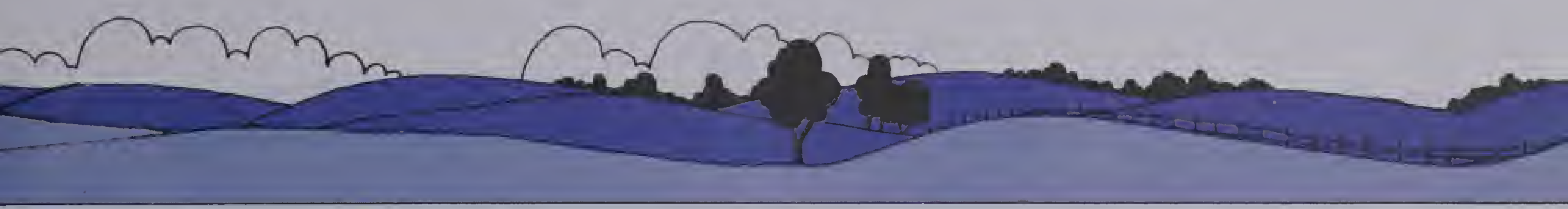
3. What is the distance around each regular decagon (10 equal sides)?

a) 3 cm b) 7 cm c) 5 cm
d) 12 cm e) 29 cm f) 35.5 cm

4. Think about 111.11, from right to left.


111.11
means 0.01
means 0.1 = 0.01 × 10
means 1 = 0.1 × 10
means 10 = 1 × 10
means 100 = 10 × 10

Repeat this pattern for 777.77



Dividing by 10

What is your rule for dividing by 10? Study the patterns.

90 ÷ 1 = 90
90 ÷ 10 = 9
9 ÷ 10 = 0.9

190 ÷ 1 = 190
190 ÷ 10 = 19
19 ÷ 10 = 1.9

9 ÷ 1 = 9
9 ÷ 10 = 0.9
0.9 ÷ 10 = 0.09

1.9 ÷ 1 = 1.9
1.9 ÷ 10 = 0.19
99.9 ÷ 10 = 9.99

IN ACTION

1. Complete.

a) 40 ÷ 1 = ?
40 ÷ 10 = ?
4 ÷ 10 = ?

b) 140 ÷ 1 = ?
140 ÷ 10 = ?
14 ÷ 10 = ?

c) 4 ÷ 1 = ?
4 ÷ 10 = ?
0.4 ÷ 10 = ?

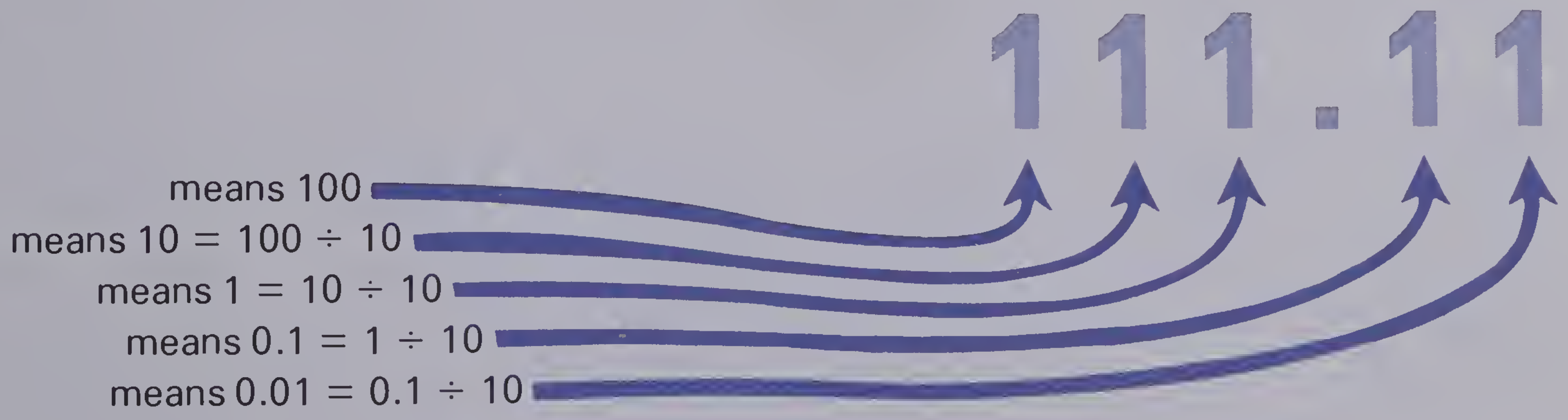
d) 0.4 ÷ 1 = ?
0.4 ÷ 10 = ?
4.4 ÷ 10 = ?

e) 12.4 ÷ 1 = ?
12.4 ÷ 10 = ?
112.4 ÷ 10 = ?

2. Write the quotients.

a) 7 ÷ 10
b) 17 ÷ 10
c) 57 ÷ 10
d) 157 ÷ 10
e) 657 ÷ 10
f) 0.2 ÷ 10
g) 1.2 ÷ 10
h) 8.2 ÷ 10
i) 48.2 ÷ 10
j) 648 ÷ 10
k) 4.8 ÷ 10
l) 29.3 ÷ 10
m) 37.6 ÷ 10
n) 540 ÷ 10
o) 940.3 ÷ 10

3. Think about 111.11, from left to right.


111.11
means 100
means 10 = 100 ÷ 10
means 1 = 10 ÷ 10
means 0.1 = 1 ÷ 10
means 0.01 = 0.1 ÷ 10

Repeat the pattern for 222.22

Multiplying by 100 / Dividing by 100

What is your rule for multiplying by 100? Study the patterns.

6 × 10 = 60
6 × 100 = 600
26 × 100 = 2600

0.6 × 10 = 6
0.6 × 100 = 60
2.6 × 100 = 260

0.06 × 10 = 0.6
0.06 × 100 = 6
0.26 × 100 = 26

0.16 × 10 = 1.6
0.16 × 100 = 16
2.16 × 100 = 216

What is your rule for dividing by 100? Study the patterns.

6 × 100 = 600
600 ÷ 100 = 6

0.6 × 100 = 60
60 ÷ 100 ÷ 0.6

0.06 × 100 = 6
6 ÷ 100 = 0.06

0.16 × 100 = 16
16 ÷ 100 = 0.16

26 × 100 = 2600
2600 ÷ 100 = 26

2.6 × 100 = 260
260 ÷ 100 = 2.6

2.06 × 100 = 206
206 ÷ 100 = 2.06

2.16 × 100 = 216
216 ÷ 100 = 2.16

IN ACTION

1. Complete.
   - a) 7 × 100 = ?
? ÷ 100 = 7
   - b) 0.5 × 100 = ?
? ÷ 100 = 0.5
   - c) 0.04 × 100 = ?
? ÷ 100 = 0.04
   - d) 0.18 × 100 = ?
? ÷ 100 = 0.18
   - e) 76 × 100 = ?
? ÷ 100 = 76
   - f) 7.5 × 100 = ?
? ÷ 100 = 7.5
   - g) 5.34 × 100 = ?
? ÷ 100 = 5.34
   - h) 7.59 × 100 = ?
? ÷ 100 = 7.59
   - i) 69 × 100 = ?
? ÷ 100 = 69
   - j) 8.1 × 100 = ?
? ÷ 100 = 8.1
   - k) 76 × 100 = ?
? ÷ 100 = 8.76
   - l) 9.01 × 100 = ?
? ÷ 100 = 9.01

2. Multiply by 100.
   - a) 34
   - b) 5.9
   - c) 0.7
   - d) 0.01
   - e) 0.25
   - f) 3.79
   - g) 17.6
   - h) 28.04
   - i) 79.31
   - j) 129.4
   - k) 174.32
   - l) 61.09
   - m) 19.1
   - n) 29.10
   - o) 86.49
   - p) 219.7
   - q) 265.45
   - r) 34.50

3. Divide by 100.
   - a) 7500
   - b) 350
   - c) 42
   - d) 9
   - e) 18
   - f) 142
   - g) 1000
   - h) 4000
   - i) 876
   - j) 11
   - k) 1
   - l) 3
   - m) 2000
   - n) 6000
   - o) 904
   - p) 22
   - q) 5
   - r) 55

Multiplying by 1000 / Dividing by 1000

What is your rule for multiplying by 1000? Study the patterns.

$4 \times 10 = 40$ $0.4 \times 10 = 4$ $0.07 \times 10 = 0.7$ $0.17 \times 10 = 1.7$
$4 \times 100 = 400$ $0.4 \times 100 = 40$ $0.07 \times 100 = 7$ $0.17 \times 100 = 17$
$4 \times 1000 = 4000$ $0.4 \times 1000 = 400$ $0.07 \times 1000 = 70$ $0.17 \times 1000 = 170$
$64 \times 1000 = 64\ 000$ $6.4 \times 1000 = 6400$ $0.67 \times 1000 = 670$ $6.17 \times 1000 = 6170$

What is your rule for dividing by 1000? Study the patterns.

$4000 \div 1000 = 4$ $400 \div 1000 = 0.4$ $70 \div 1000 = 0.07$ $170 \div 1000 = 0.17$
$64\ 000 \div 1000 = 64$ $6400 \div 1000 = 6.4$ $670 \div 1000 = 0.67$ $6170 \div 1000 = 6.17$

IN ACTION

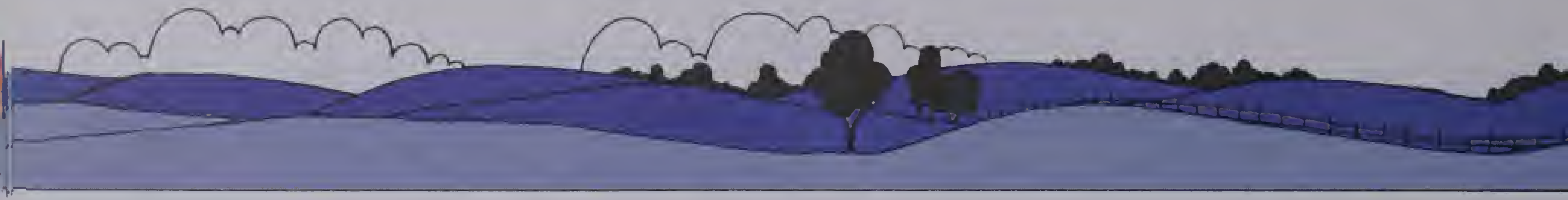
1. Complete.
   a) $3 \times 1000 = ?$ b) $0.2 \times 1000 = ?$ c) $0.09 \times 1000 = ?$ d) $0.47 \times 1000 = ?$
   $5000 \div 1000 = ?$ $300 \div 1000 = ?$ $80 \div 1000 = ?$ $5870 \div 1000 = ?$
   e) $75 \times 1000 = ?$ f) $9.2 \times 1000 = ?$ g) $4.03 \times 1000 = ?$ h) $7.29 \times 1000 = ?$
   $93\ 000 \div 1000 = ?$ $6100 \div 1000 = ?$ $5670 \div 1000 = ?$ $8460 \div 1000 = ?$

2. Multiply by 1000.
   a) 2 b) 12 c) 3.4 d) 13.8 e) 0.79 f) 9.28
   g) 8 h) 28 i) 8.1 j) 47.6 k) 9.01 l) 5.11

3. Divide by 1000.
   a) 19 000 b) 1200 c) 350 d) 85 000 e) 100 f) 10
   g) 34 000 h) 1800 i) 970 j) 75 000 k) 200 l) 20

4. Solve.
   a) $n = 3 \times 1000$ b) $k = 6.1 \times 1000$ c) $m = 0.11 \times 1000$ d) $p = 4.01 \times 1000$
   e) $q = 81\ 000 \div 1000$ f) $y = 1400 \div 1000$ g) $w = 300 \div 1000$ h) $v = 30 \div 1000$

5. There are 1000 cents in $10. How many cents in
   a) $20 b) $40 c) $50 d) $100 e) $25 f) $5?



Multiplication / A 2-Digit Factor by a 1-Digit Factor

Find 38 × 6.

If you write 38 as 30 + 8,
you can do the multiplication this way:

$$\begin{array}{r} 30 + \quad 8 \\ 6 \\ \hline 180 + \quad 48 \\ = 228 \end{array}$$

You could write the
products in columns:

$$\begin{array}{rl} 38 & \\ 6 & \\ \hline 48 & \longrightarrow 8 \times 6 \\ 180 & \longrightarrow 30 \times 6 \\ \hline 228 & \end{array}$$

You can shorten your work this way:

$$\begin{array}{r} 38 \\ 6 \\ \hline 228 \end{array}$$

Think	Record
48	8
18, 22	22

Check: 38 × 6 is about 40 × 6 or 240.
The product is reasonable.

IN ACTION

1. Multiply. Use the expanded form. Check by estimating.
   a) 16 by 5 b) 17 by 9 c) 19 by 7 d) 24 by 8 e) 35 by 4
   f) 43 by 6 g) 69 by 5 h) 78 by 9 i) 87 by 6 j) 96 by 8

2. Solve.
   a) $k = 19 \times 8$ b) $p = 43 \times 7$ c) $q = 54 \times 6$ d) $m = 78 \times 5$
   e) $n = 49 \times 9$ f) $w = 67 \times 8$ g) $y = 84 \times 9$ h) $u = 97 \times 8$

3. At the weekend camp, there are 16 girls in each group. There are 9 groups in a section. How many girls are there in a section?

4. There are 8 cases of fruit juice. Each box has 48 cans. How many cans are there altogether?

Multiplication with Decimals

Find 19 × 6.

Think	Record
54	4
6,11	11

$$\begin{array}{r} 19 \\ 6 \\ \hline \mathbf{114} \end{array}$$

19 × 6 is about 20 × 6 or 120.

Find 1.9 × 6.

$$\begin{array}{r} 1.9 \\ 6 \\ \hline \mathbf{11.4} \end{array}$$

1.9 × 6 is about 2 × 6 or 12.
Place the decimal point as shown.

How many digits are there after the decimal point in the factors?

How many digits are there after the decimal point in the product?

IN ACTION

1. Find the products. Think the regrouping. Check by estimating.

a) 16 × 5
1.6 × 5

b) 17 × 9
1.7 × 9

c) 19 × 7
1.9 × 7

d) 24 × 8
2.4 × 8

e) 35 × 4
3.5 × 4

f) 43 × 6
4.3 × 6

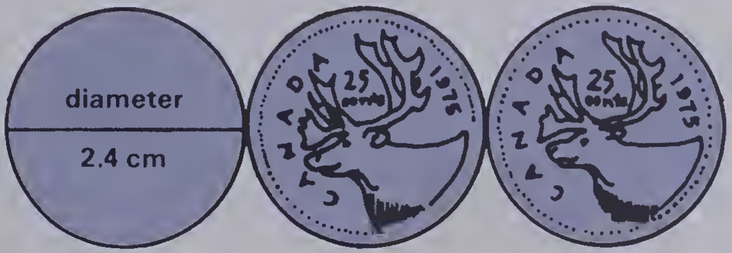
g) 69 × 5
6.9 × 5

h) 78 × 9
7.8 × 9

i) 87 × 6
8.7 × 6

j) 96 × 8
9.6 × 8

2.



a) If the **diameter** of a quarter is 2.4 cm, what is the length of $2 in quarters placed as shown?
b) What is the length of the same value in dimes? The diameter of a dime is 1.8 cm.

3. What is the value of your hand span in quarters? The quarters are placed as in Question 2. How did you solve the problem?

4. If 1 ℓ of milk has a mass of 1.1 kg, what is the mass of 3 ℓ of milk?

Multiplication / A 3-Digit Factor by a 1-Digit Factor

Find 469 × 8.
If you write 469 as 400 + 60 + 9,
you can do the multiplication this way:

$$\begin{array}{rcrcr} 400 & + & 60 & + & 9 \\ & & & & 8 \\ \hline 3200 & + & 480 & + & 72 \\ & & & = & 3752 \end{array}$$

You could write the products in columns:

$$\begin{array}{rl} 469 & \\ 8 & \\ \cline{1-1} 72 & \longrightarrow 9 \times 8 \\ 480 & \longrightarrow 60 \times 8 \\ 3200 & \longrightarrow 400 \times 8 \\ \cline{1-1} 3752 & \end{array}$$

You can shorten your work this way:

$$\begin{array}{r} 469 \\ 8 \\ \hline \mathbf{3752} \end{array}$$

Think	Record
72	2
48, 55	5
32, 37	37

Check: 469 × 8 is about 500 × 8 or 4000.
The product is reasonable.

IN ACTION

1. Multiply. Check by estimating.

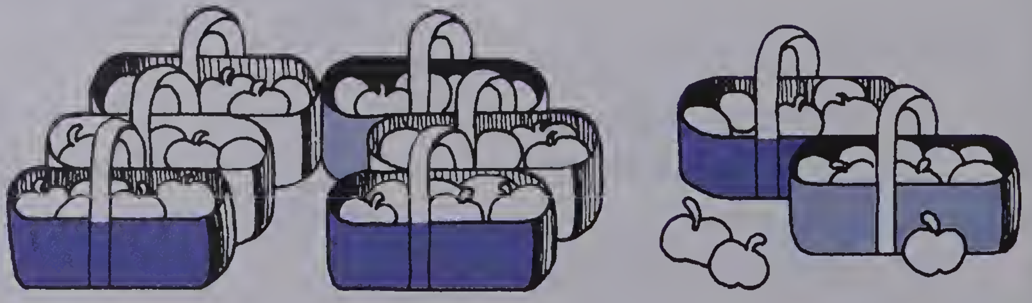
a) $\begin{array}{r} 352 \\ \underline{6} \end{array}$ b) $\begin{array}{r} 279 \\ \underline{5} \end{array}$ c) $\begin{array}{r} 487 \\ \underline{4} \end{array}$ d) $\begin{array}{r} 695 \\ \underline{8} \end{array}$ e) $\begin{array}{r} 846 \\ \underline{3} \end{array}$ f) $\begin{array}{r} 544 \\ \underline{9} \end{array}$

g) $\begin{array}{r} 683 \\ \underline{9} \end{array}$ h) $\begin{array}{r} 754 \\ \underline{6} \end{array}$ i) $\begin{array}{r} 849 \\ \underline{8} \end{array}$ j) $\begin{array}{r} 396 \\ \underline{7} \end{array}$ k) $\begin{array}{r} 725 \\ \underline{5} \end{array}$ l) $\begin{array}{r} 948 \\ \underline{4} \end{array}$

2. Solve.

a) $k = 873 \times 5$ b) $n = 769 \times 6$ c) $p = 828 \times 7$ d) $w = 964 \times 9$

3. Find the cost of 8 baskets of apples at $3.00 a basket.



4. Find the cost of 6 reference books at $12.00 each.

Multiplication with Decimals

Find 739 × 8.

$$\begin{array}{r}739\\ 8\\ \hline \mathbf{5912}\end{array}$$

Think	Record
72	2
24, 31	1
56, 59	59

Check: 739 × 8 is about 740 × 8 or 5920.
The product is reasonable.

Find 73.9 × 8.

$$\begin{array}{r}73.9\\ 8\\ \hline \mathbf{591.2}\end{array}$$

73.9 × 8 is about 74 × 8 or 592.
Place the decimal point as shown.
Check the number of digits
after the decimal point
in the factors and in the product.
Are they the same?

IN ACTION

1. Multiply. Check by estimating.

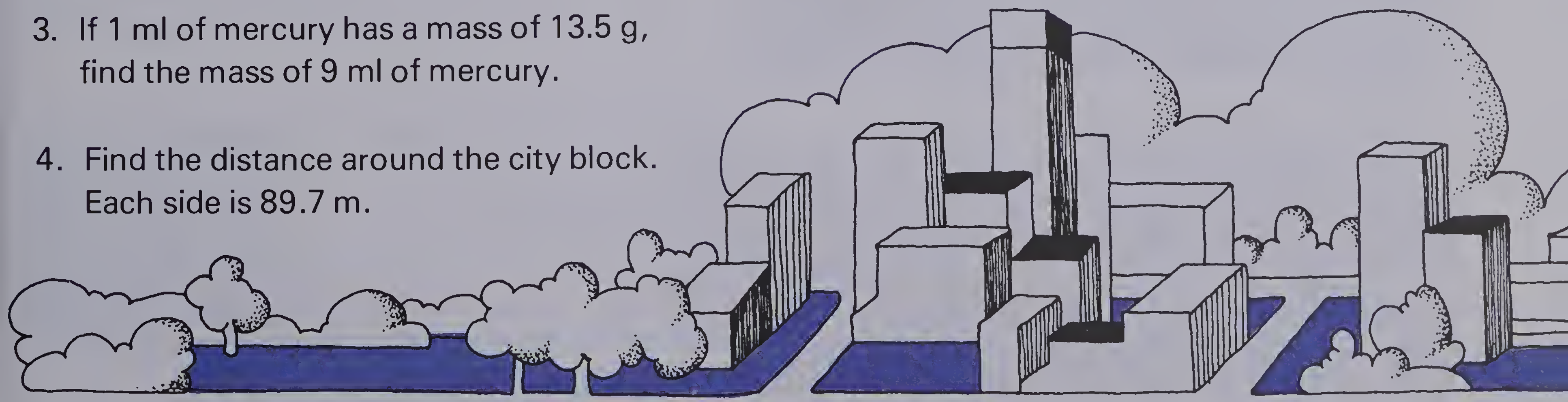
a) $\begin{array}{r}543\\ 6\\ \hline\end{array}$ $\begin{array}{r}54.3\\ 6\\ \hline\end{array}$ b) $\begin{array}{r}729\\ 4\\ \hline\end{array}$ $\begin{array}{r}72.9\\ 4\\ \hline\end{array}$ c) $\begin{array}{r}358\\ 7\\ \hline\end{array}$ $\begin{array}{r}35.8\\ 7\\ \hline\end{array}$ d) $\begin{array}{r}437\\ 8\\ \hline\end{array}$ $\begin{array}{r}43.7\\ 8\\ \hline\end{array}$ e) $\begin{array}{r}925\\ 7\\ \hline\end{array}$ $\begin{array}{r}92.5\\ 7\\ \hline\end{array}$ f) $\begin{array}{r}869\\ 8\\ \hline\end{array}$ $\begin{array}{r}86.9\\ 8\\ \hline\end{array}$

2. Solve.

a) $n = 94.3 \times 5$ b) $m = 89.6 \times 7$ c) $p = 47.8 \times 6$ d) $w = 85.7 \times 8$
e) $a = 78.1 \times 9$ f) $j = 93.2 \times 4$ g) $k = 78.5 \times 2$ h) $q = 99.9 \times 7$

3. If 1 ml of mercury has a mass of 13.5 g, find the mass of 9 ml of mercury.

4. Find the distance around the city block. Each side is 89.7 m.



BYWAY

Darts

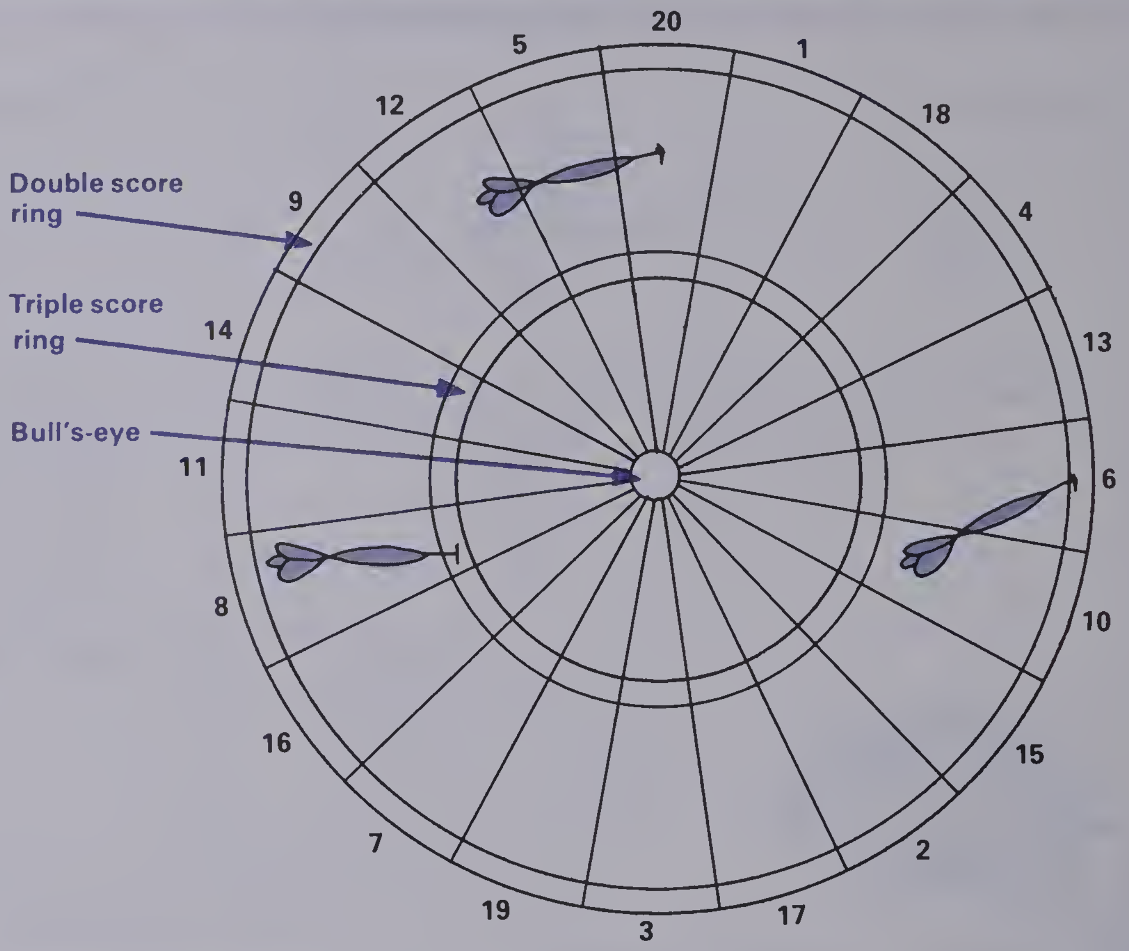
A 3-dart Play

20, double 6, triple 8

Score = (20 + 12 + 24) points
= 56 points

A Game

Each player on a team throws 3 darts.
The winning team is the one that first scores exactly 100 points.



"THE ARROWS"

Player	Play–3 Throws
1	3, double 5, 20
2	16, double 1, triple 5
3	9, double 3, 10

"THE LOOPERS"

Player	Play–3 Throws
1	15, 20, 1
2	triple 1, 8, 17
3	double 4, 16, 7

Copy and complete the chart by filling in the score of each player for round one.

Player	SCORE	
	"THE ARROWS"	"THE LOOPERS"
1		
2		
3		

How many points does each team still need to total exactly 100 points?

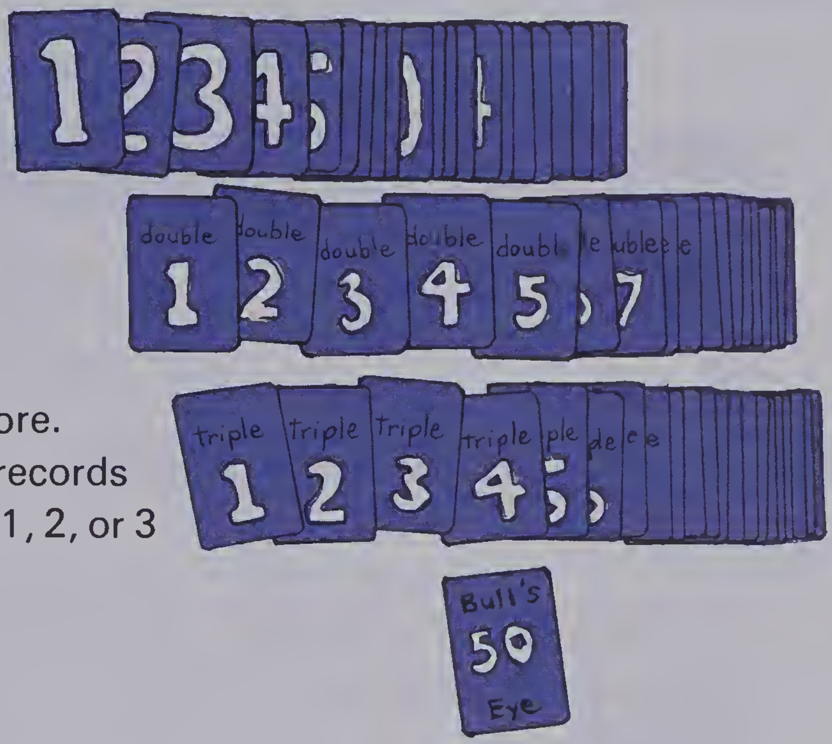
What combination of 3 throws would complete the game for each team?

What is the least number of plays (3 darts per play) needed to score 100 points? What would be the score of each throw?

What is the least possible score for a 3-dart play? What would be the score of each throw?

What is the greatest possible score for a 3-dart play? What would be the score of each throw?

Card Darts (2 to 6 Players)



Make a deck of 61 cards:
1 card for each numeral 1 to 20,
1 card for each of ''double 1'' to ''double 20'',
1 card for each of ''triple 1'' to ''triple 20'',
1 ''Bull's-eye 50''.

1. Shuffle the deck and place it face down.
2. The first player draws 3 cards and records his score.
3. The players continue to take turns until a player records a total of exactly 100 points. The player can use 1, 2, or 3 of his cards to make 100.

Dart Players

Dart players add their scores mentally.
Keep up with the champs! Add these scores and record.

''THE DRAGONS''

Player	Play
1	17, 50, 3
2	double 3, 12, 15
3	double 16, 6, triple 4

''THE EAGLES''

Player	Play
1	20, 14, 5
2	triple 5, 10, 19
3	triple 11, 17, double 15

''THE FOXES''

Player	Play
1	18, triple 7, 10
2	20, double 15, 20
3	19, 17, triple 10

Tell how each player on each team can score 100 on the next play. Some dart competitions have a rule that a player can only make a winning score of 100 by throwing a double on the last throw of 3 darts. What double must each player throw to be a winner?

''THE BEARS''

Player	Score
1	48
2	61
3	56

Last Play

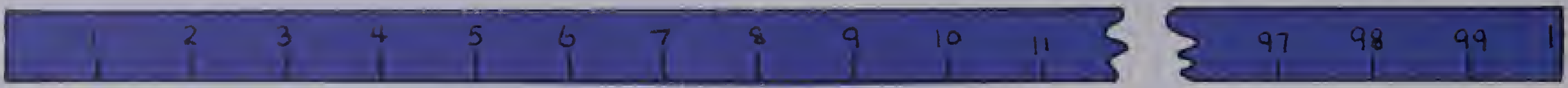
Throw 1	Throw 2	Throw 3 (double to win)
triple 8	16	?
13	6	?
double 17	6	?

Create 3 other scores like these. Remember: you need a double to win.

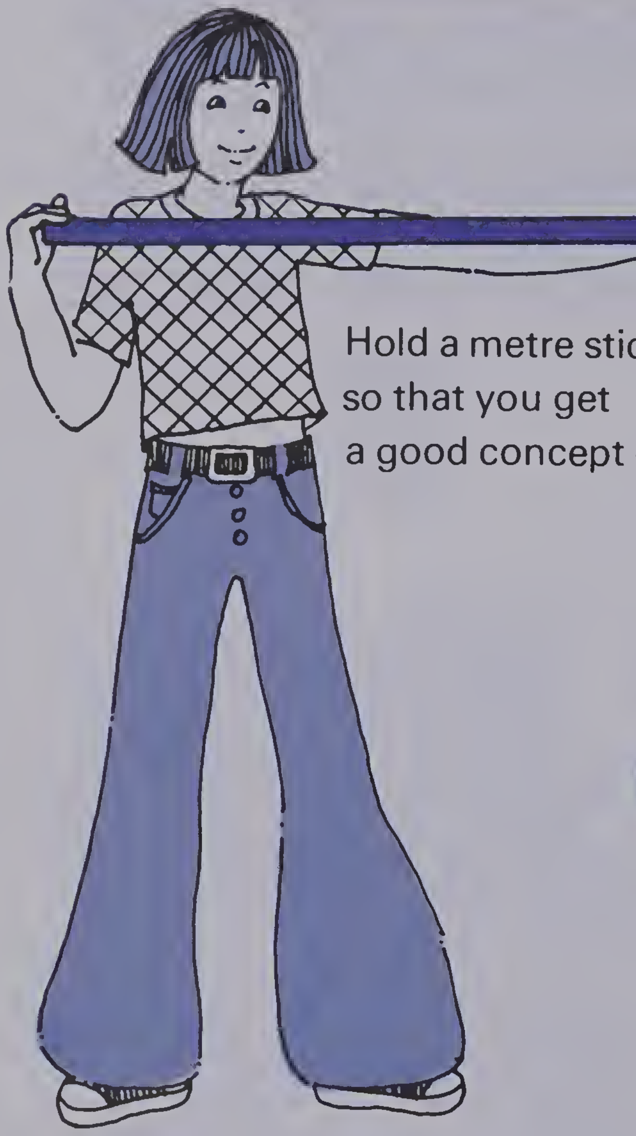
EXPLORE

LENGTH/ The Metre m

The **metre** is the base unit of length.

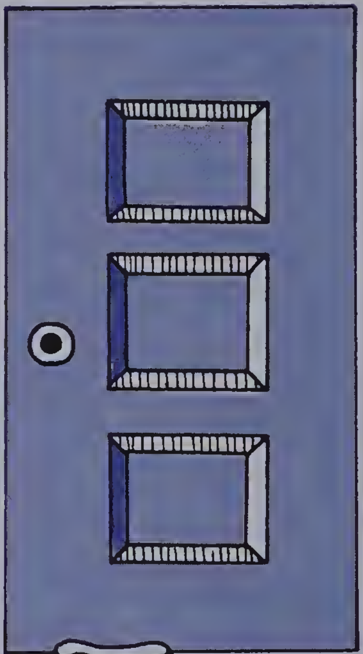


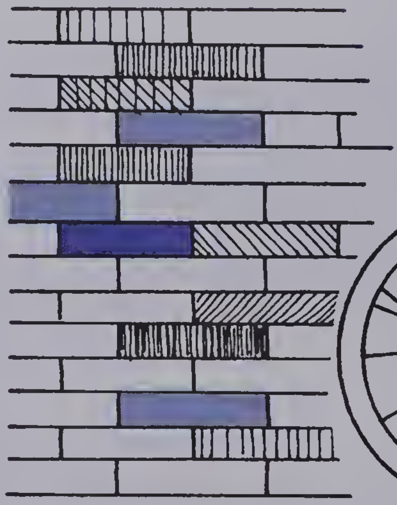
one metre
1 m



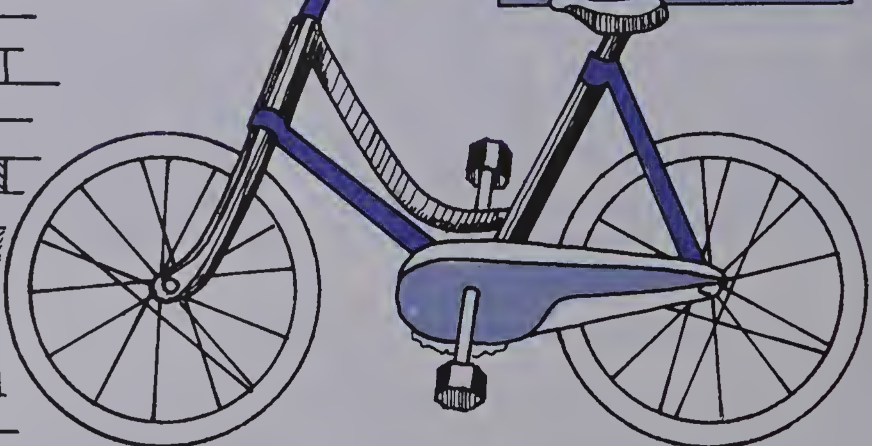
Hold a metre stick
so that you get
a good concept of 1 m.

A door knob
is usually 1 m
from the floor.





About 14 layers
of brick are 1 m high.



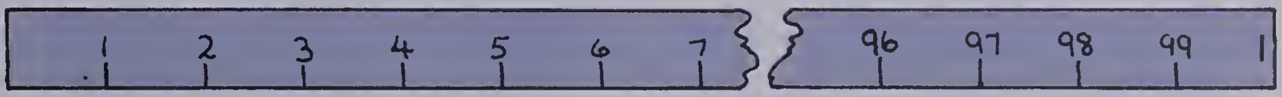
Some bicycles are about 1 m high.

IN ACTION

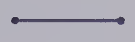
Mark a line on the floor that is 1 m long.
Look at the line. When you think you have a good concept of 1 m, copy and complete the chart.

Object	Estimated length (metres)	Measured length (metres)
length of classroom		
width of classroom		
length of hall		

The Centimetre cm


1
2
3
4
5
6
7
96
97
98
99
1

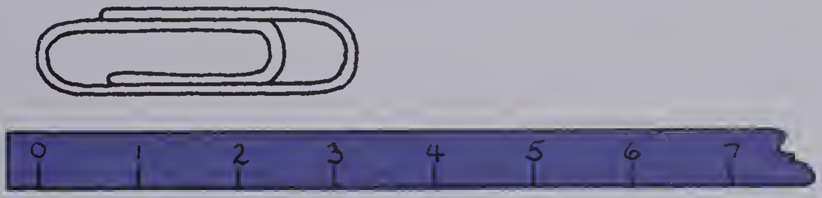
A metre is divided into 100 equal parts.
Each part is 1 cm (one centimetre).
1 m = 100 cm
This line segment is 1 cm long.

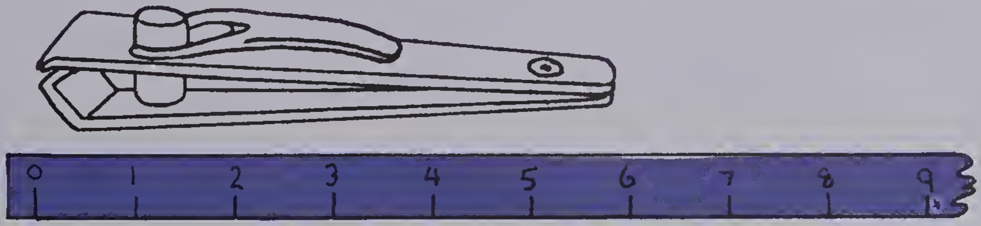


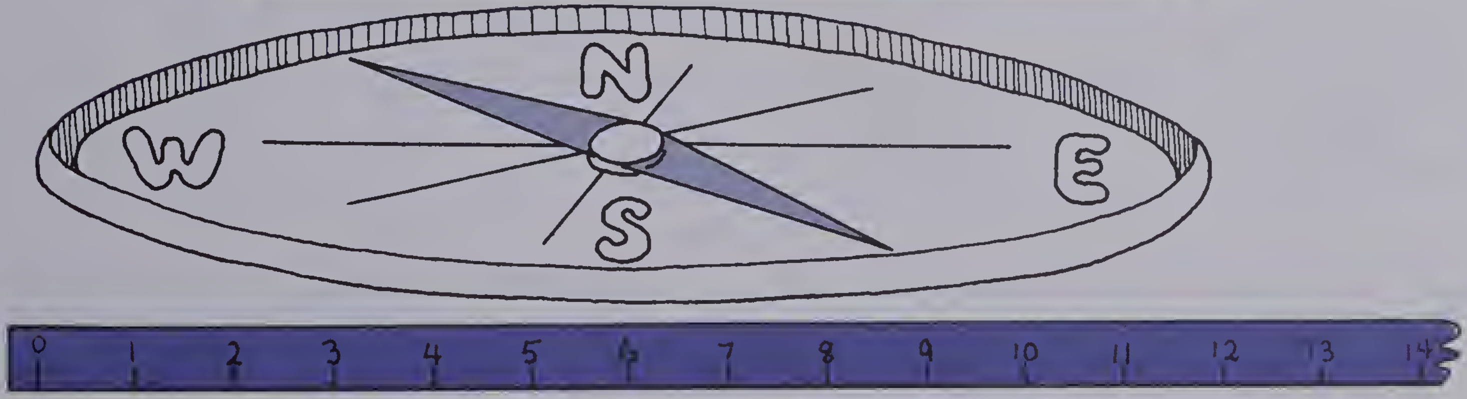
1 cm

IN ACTION

1. Give the length of each object to the nearest centimetre.

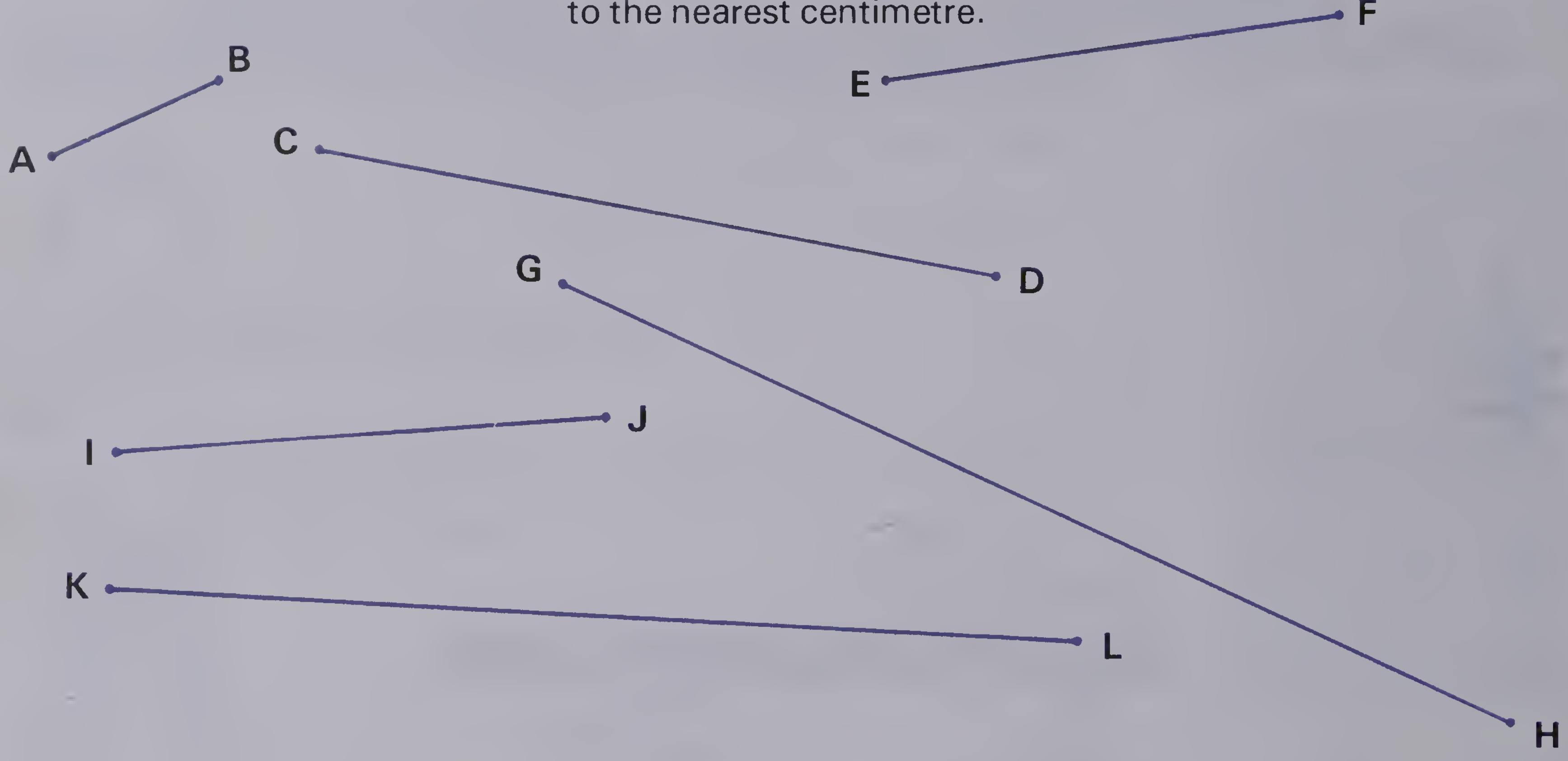



0
1
2
3
4
5
6
7
8
9

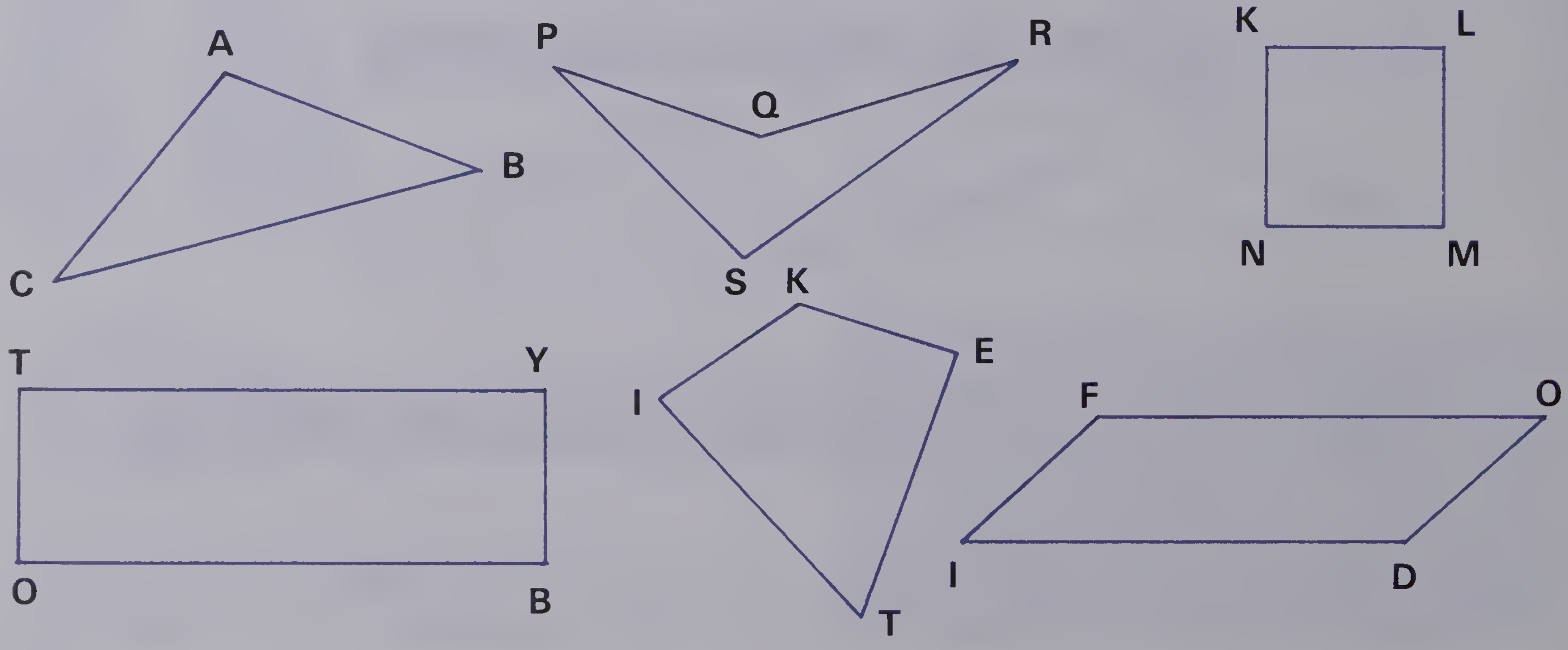

N
W
E
S
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

2. About how many centimetres long is
a) your foot
b) your hand span
c) a textbook
d) a desk
e) your longest finger
f) a pair of scissors
g) a pencil
h) an eraser?

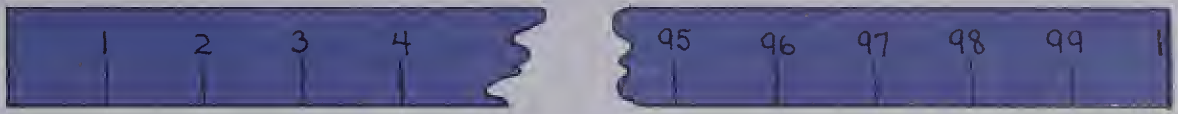
3. Estimate, then measure each line segment to the nearest centimetre.


B
F
E
A
C
G
D
J
I
K
L
H

4. Estimate, then measure to the nearest centimetre each side of these geometric figures.


A
P
R
K
L
Q
B
C
S
K
N
M
E
T
Y
F
O
I
I
O
B
D
T

Expressing Metres in Centimetres / Centimetres in Metres



In 1 m there are 100 cm.
1 m = 100 cm

How many centimetres are there in 2 m?
Multiplying by 100 is easy.
2 × 100 = 200

1 m = 100 cm
2 m = (2 × 100) cm
2 m = 200 cm

How many centimetres are there in 5 m?
1 m = 100 cm
5 m = (5 × 100) cm
5 m = 500 cm

How many metres are there in 200 cm?
Dividing by 100 is easy.
200 ÷ 100 = 2

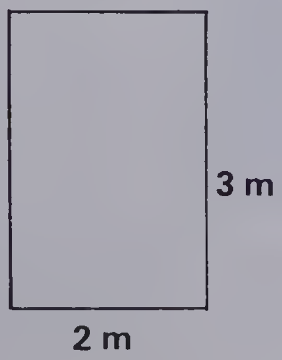
100 cm = 1 m
200 cm = (200 ÷ 100) m
200 cm = 2 m

How many metres are there in 500 cm?
100 cm = 1 m
500 cm = (500 ÷ 100) m
500 cm = 5 m

IN ACTION

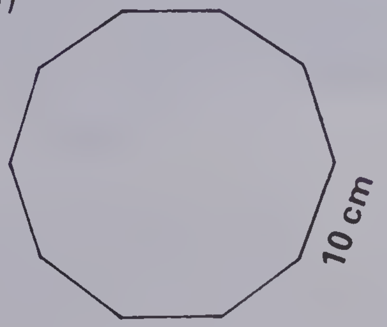
1. Complete.
   - a) 3 m = ? cm
   - b) 700 cm = ? m
   - c) 5 m = ? cm
   - d) 7 m = ? cm
   - e) 100 cm = ? m
   - f) 1000 cm = ? m
   - g) 1 m = ? cm
   - h) 400 cm = ? m
   - i) 900 cm = ? m
   - j) 2 m = ? cm
   - k) 600 cm = ? m
   - l) 800 cm = ? m
   - m) 10 m = ? cm
   - n) 18 m = ? cm
   - o) 200 cm = ? m
   - p) 25 m = ? cm

2. a)



What is the distance around the rectangle in centimetres?

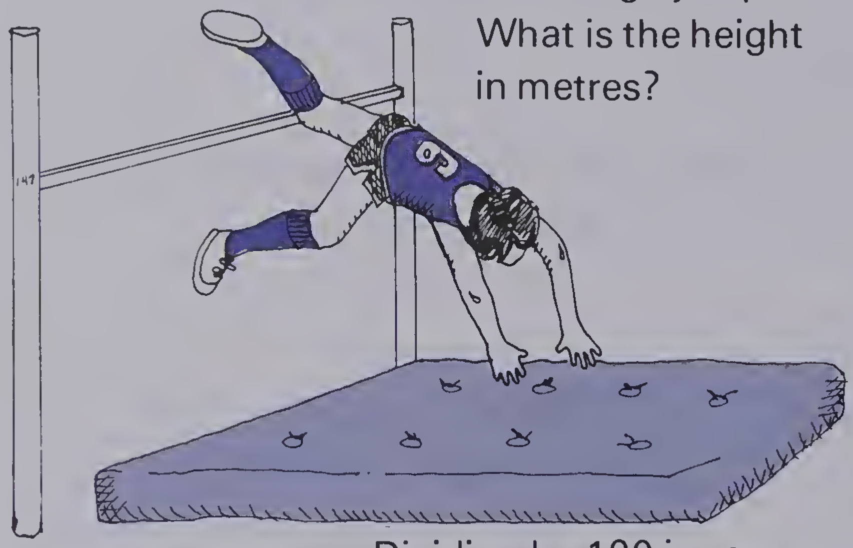
b)



What is the distance around the decagon in metres?

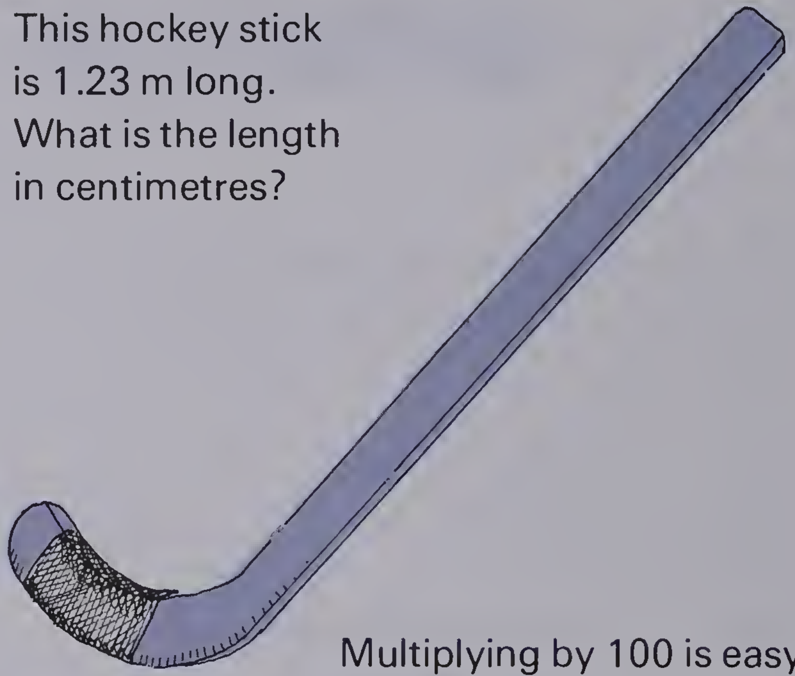
Relating Metres and Centimetres

Jim jumped 147 cm
in the high jump.
What is the height
in metres?



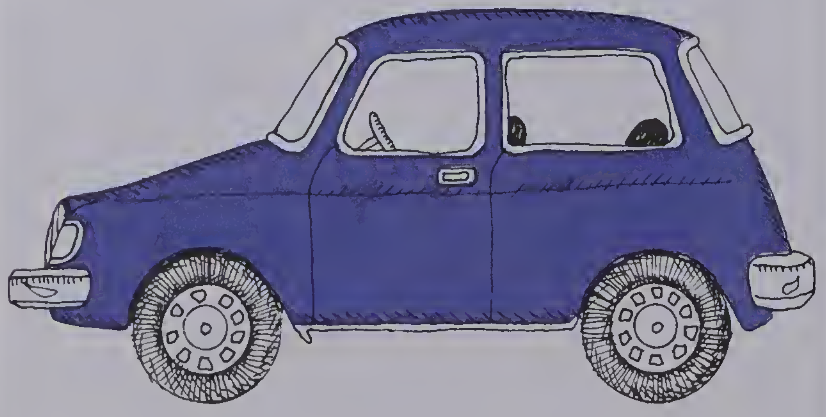
Dividing by 100 is easy.
$147 \div 100 = 1.47$
$147 \text{ cm} = (147 \div 100) \text{ m}$
$147 \text{ cm} = 1.47 \text{ m}$

This hockey stick
is 1.23 m long.
What is the length
in centimetres?



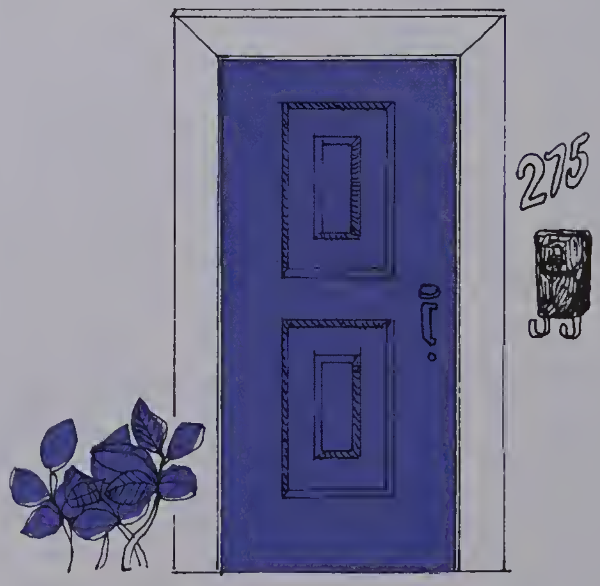
Multiplying by 100 is easy.
$1.23 \times 100 = 123$
$1.23 \text{ m} = (1.23 \times 100) \text{ cm}$
$1.23 \text{ m} = 123 \text{ cm}$

This compact car is
402 cm long.
What is its length in metres?



$402 \text{ cm} = (402 \div 100) \text{ m}$
$402 \text{ cm} = 4.02 \text{ m}$

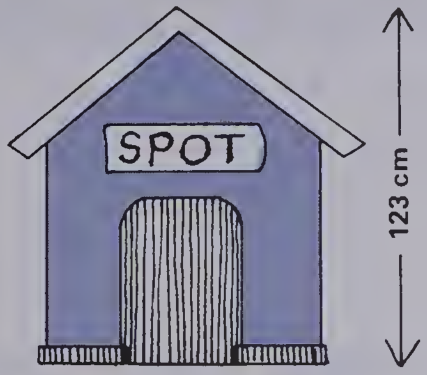
This door is
2.10 m high.
What is its height in centimetres?



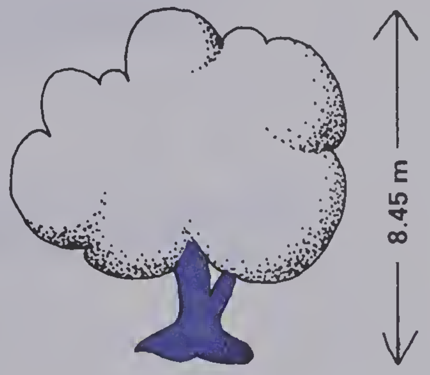
$2.1 \text{ m} = (2.1 \times 100) \text{ cm}$
$2.1 \text{ m} = 210 \text{ cm}$

IN ACTION

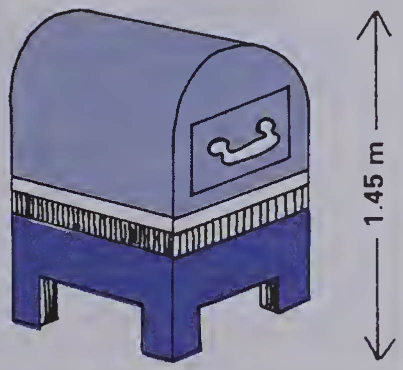
1\.
What is the height in metres?



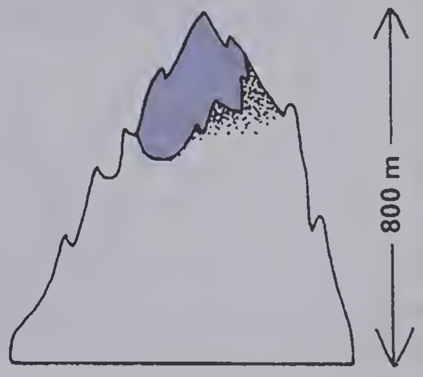
2\.
What is the height in centimetres?



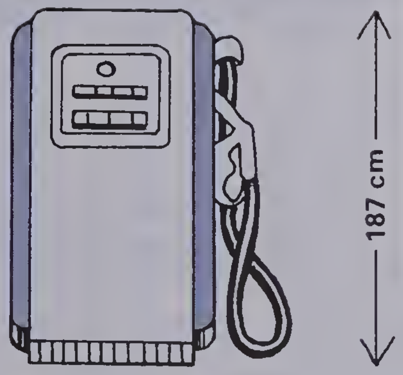
3\.
What is the height in centimetres?



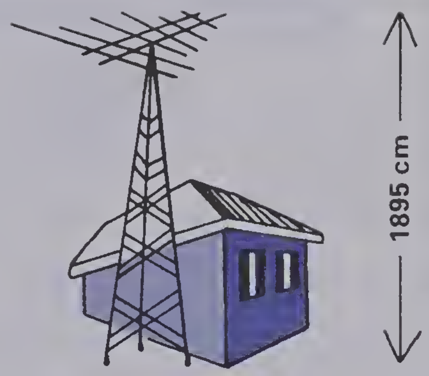
4\.
What is the height in centimetres?



5\.
What is the height in metres?



6\.
What is the height in metres?

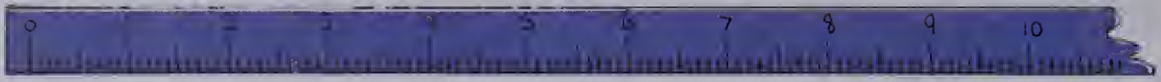


7. Complete.

a) 18 m = ? cm
b) 787 cm = ? m
c) 600 cm = ? m
d) 15.29 m = ? cm
e) 1470 cm = ? m
f) 37 m = ? cm
g) 1.09 m = ? cm
h) 1500 cm = ? m
i) 5.7 m = ? cm

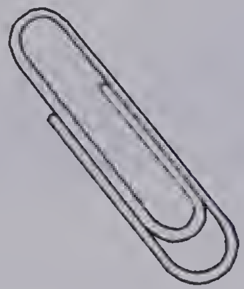
8. Measure each object. Give its length in a) metres b) centimetres.
i) your desk ii) your index finger iii) a door

The Millimetre mm

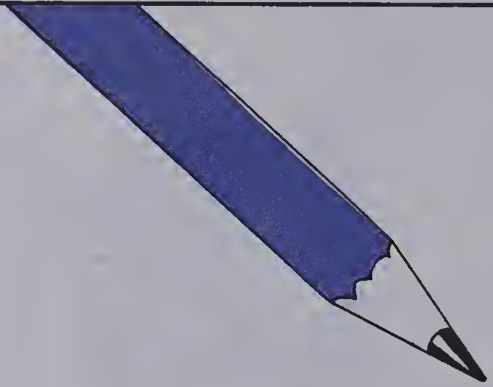


A centimetre is divided into 10 equal parts.
Each part is 1 mm (one millimetre).
This line segment is 1 mm long.

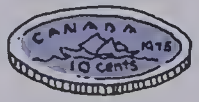
1 mm



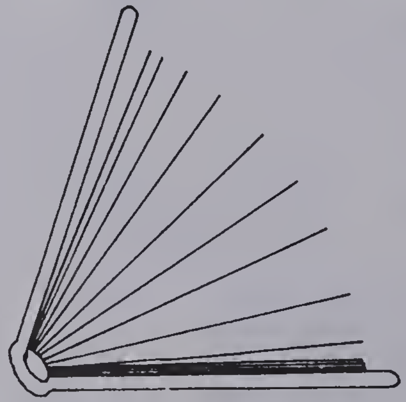
The wire in a paper clip is about 1 mm thick.



The lead in a pencil is about 1 mm thick.



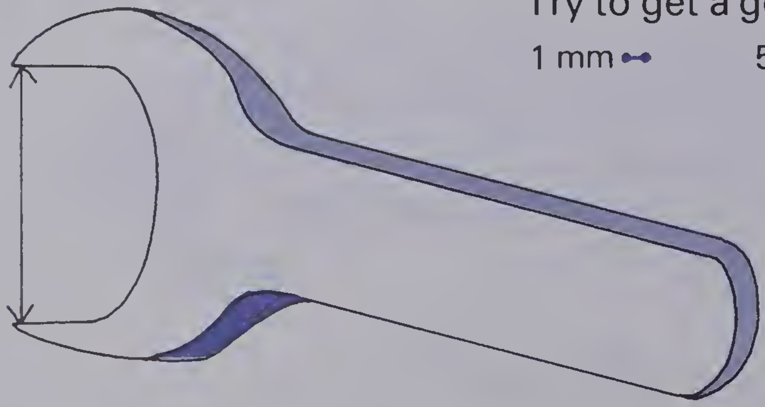
A dime is about 1 mm thick.

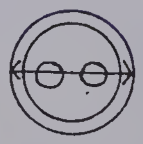


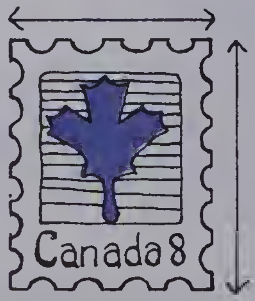
About 26 pages of this book have a thickness of 1 mm.

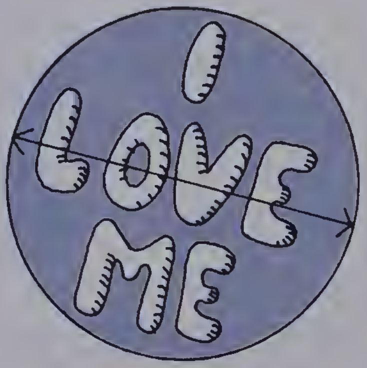
Look at the line segments below. The length of each is given.
Try to get a good picture of each length.

1 mm   5 mm   10 mm



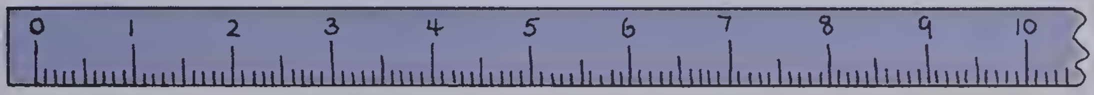




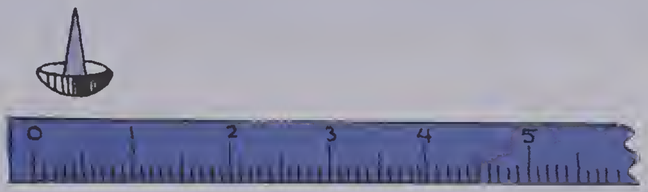


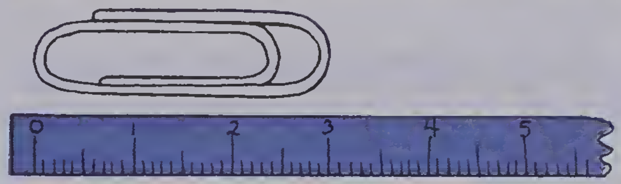
Estimate, then measure each object in millimetres.

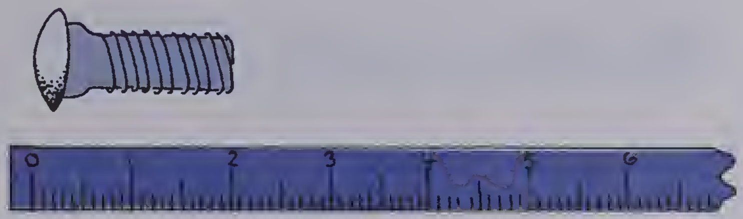
IN ACTION

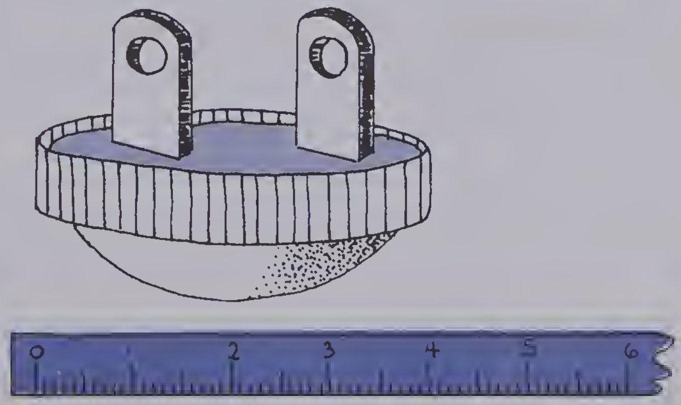


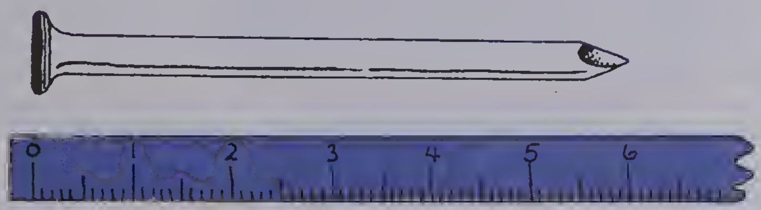
1. About how many millimetres long is each object?







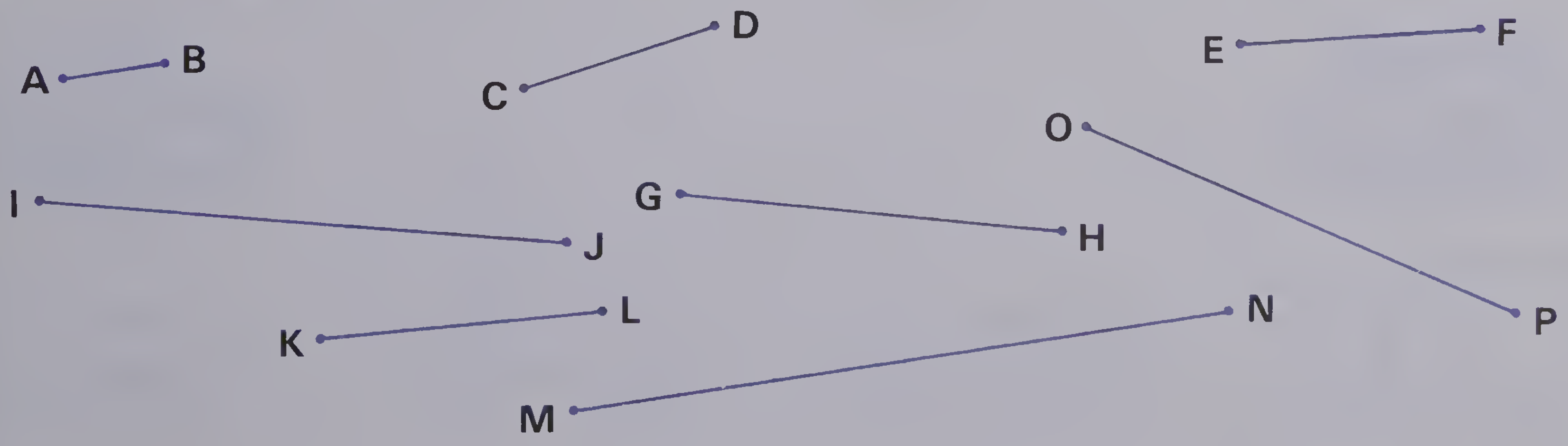




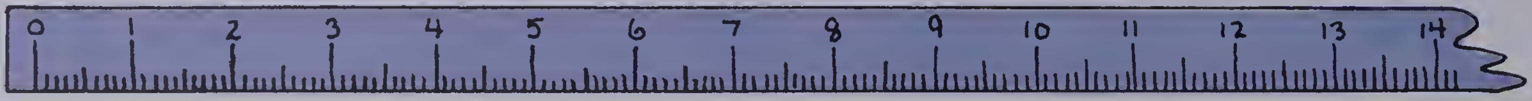
2. Estimate, then measure in millimetres.

a) the length of a finger nail
b) the width of the same nail
c) the thickness of this book
d) the length of an eraser
e) the length of the first word in Question 2.

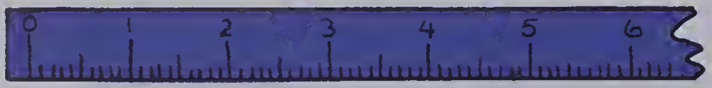
3. Estimate, then measure each line segment in millimetres.



Expressing Centimetres in Millimetres
Expressing Millimetres in Centimetres



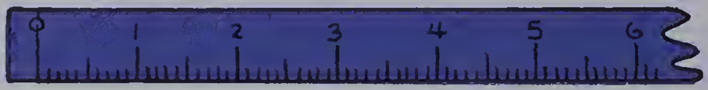
In 1 cm there are 10 mm.
1 cm = 10 mm



How many millimetres are there in 4 cm?
Multiplying by 10 is easy.
1 cm = 10 mm
4 cm = (4 × 10) mm
4 cm = 40 mm

How many centimetres are there in 50 mm?
Dividing by 10 is easy.
10 mm = 1 cm
50 mm = (50 ÷ 10) cm
50 mm = 5 cm

How many millimetres are there in 2 cm?
1 cm = 10 mm
2 cm = (2 × 10) mm
2 cm = 20 mm



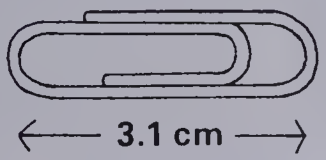
How many centimetres are there in 30 mm?
10 mm = 1 cm
30 mm = (30 ÷ 10) cm
30 mm = 3 cm

IN ACTION

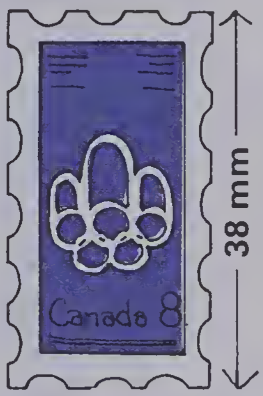
Complete.
a) 7 cm = ? mm
b) 30 mm = ? cm
c) 2 cm = ? mm
d) 50 mm = ? cm
e) 15 cm = ? mm
f) 8 cm = ? mm
g) 10 mm = ? cm
h) 60 mm = ? cm
i) 100 mm = ? cm
j) 9 cm = ? mm
k) 6 cm = ? mm
l) 70 mm = ? cm

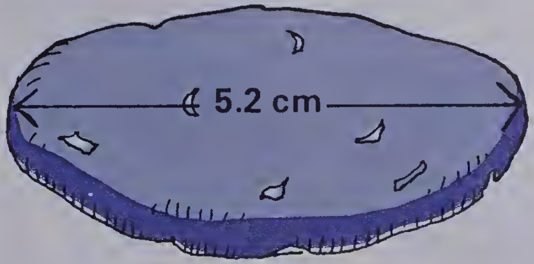
Relating Centimetres and Millimetres

This paper clip is 3.1 cm long.
What is its length in millimetres?
3.1 cm = (3.1 × 10) mm
3.1 cm = 31 mm

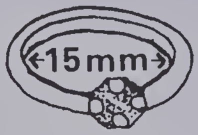


A new Canadian stamp is 38 mm long.
What is its length in centimetres?
38 mm = (38 ÷ 10) cm
38 mm = 3.8 cm





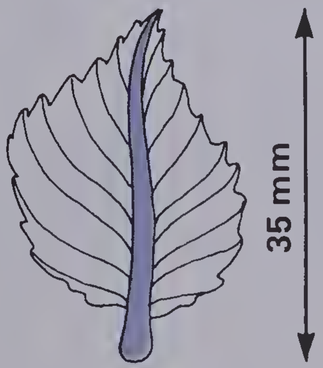
A peanut butter cookie has a diameter of 5.2 cm.
How many millimetres is that?
5.2 cm = (5.2 × 10) mm
5.2 cm = 52 mm



Joan's ring has a diameter of 15 mm.
How many centimetres is that?
15 mm = (15 ÷ 10) cm
15 mm = 1.5 cm

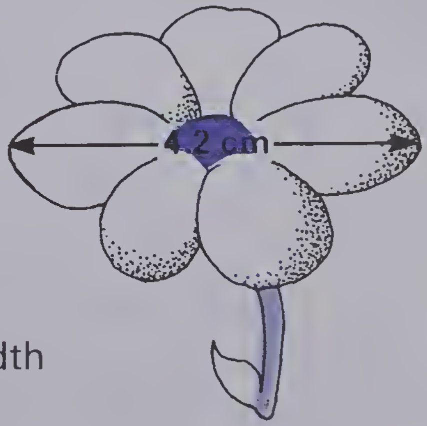
IN ACTION

1.



What is the length in centimetres?

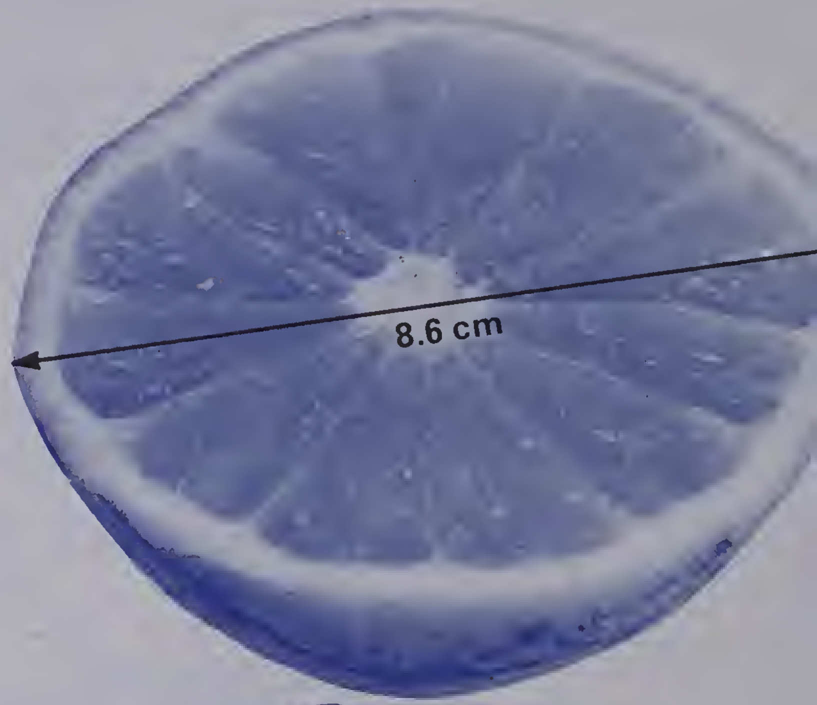
2.



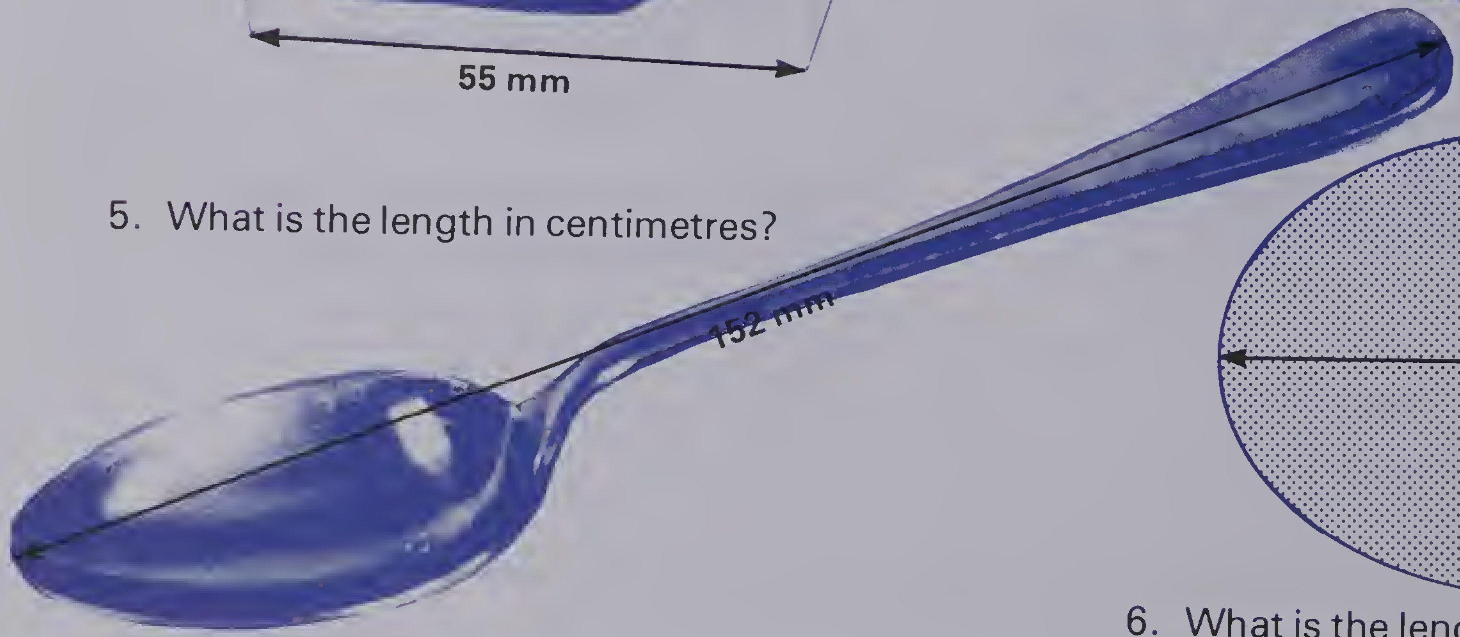
What is the width in millimetres?

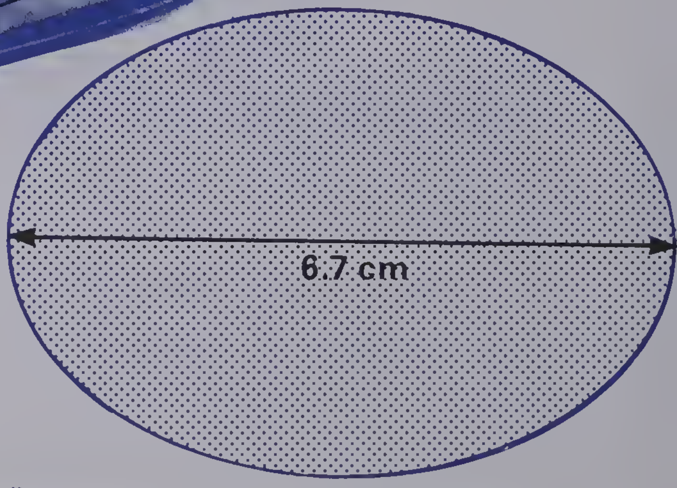
3. What is the length in centimetres?

4. What is the length in millimetres?



5. What is the length in centimetres?





6. What is the length in millimetres?

7. Complete.

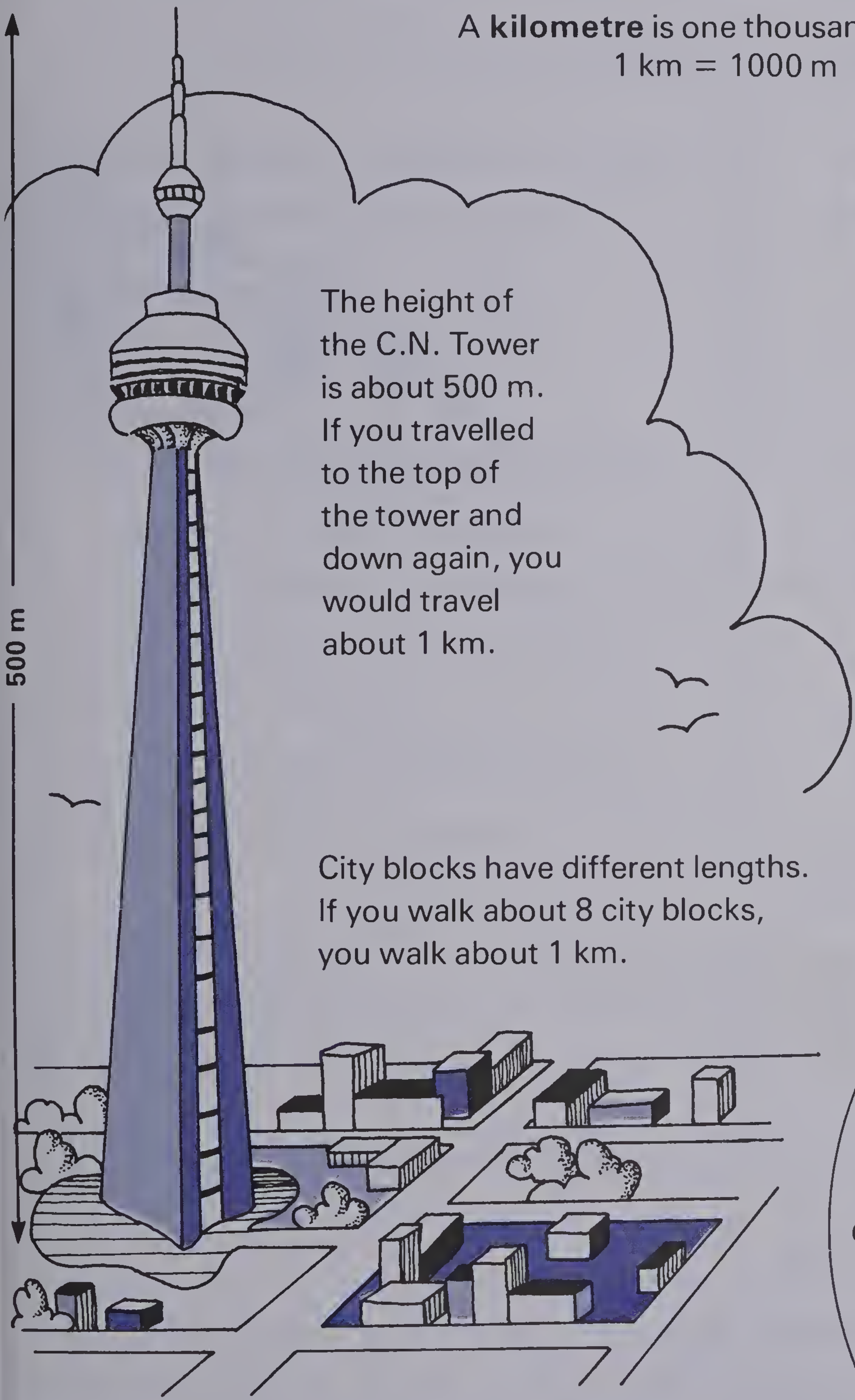
   a) 32 mm = ? cm
   b) 5.4 cm = ? mm
   c) 97 mm = ? cm
   d) 13.2 cm = ? mm
   e) 83 mm = ? cm
   f) 1 cm = ? mm
   g) 137 mm = ? cm
   h) 200 mm = ? cm
   i) 15.5 cm = ? mm

8. Measure each object. Give its length in a) centimetres b) millimetres.

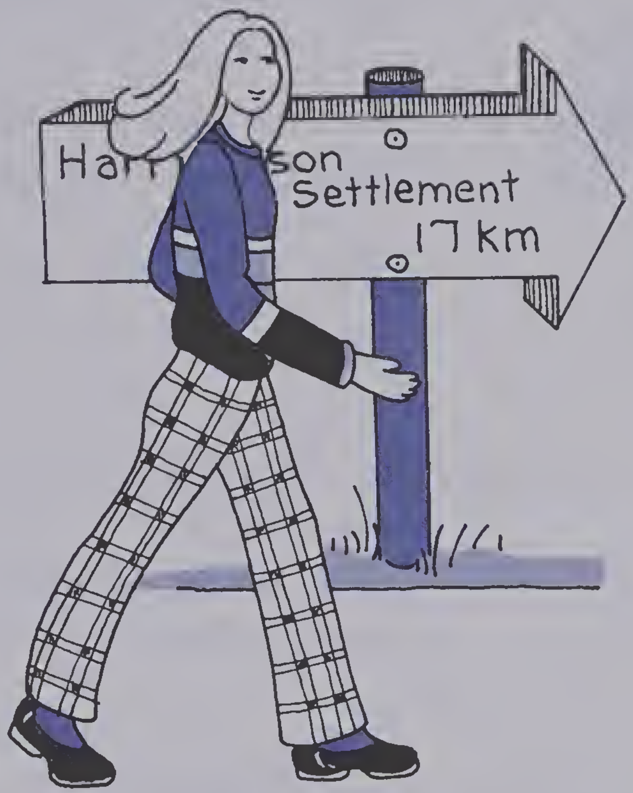
   i) *Mathways 5*
   ii) this line segment **A** ——————————— **B**
   iii) your hand span
   iv) an envelope

The Kilometre km

A **kilometre** is one thousand metres.
1 km = 1000 m



The height of the C.N. Tower is about 500 m. If you travelled to the top of the tower and down again, you would travel about 1 km.


Har son
Settlement
17 km

It takes about 12 min to walk 1 km.

City blocks have different lengths. If you walk about 8 city blocks, you walk about 1 km.

EDMONTON
300 km
CALGARY

Try to get a good concept of 1 km.

Expressing Kilometres in Metres / Metres in Kilometres

In 1 km there are 1000 m.
1 km = 1000 m

How many metres are there in 2 km?
Multiplying by 1000 is easy.
1 km = 1000 m
2 km = (2 × 1000) m
2 km = 2000 m

How many metres are there in 2.4 km?
1 km = 1000 m
2.4 km = (2.4 × 1000) m
2.4 km = 2400 m

How many kilometres are there in 3000 m?
Dividing by 1000 is easy.
1000 m = 1 km
3000 m = (3000 ÷ 1000) km
3000 m = 3 km

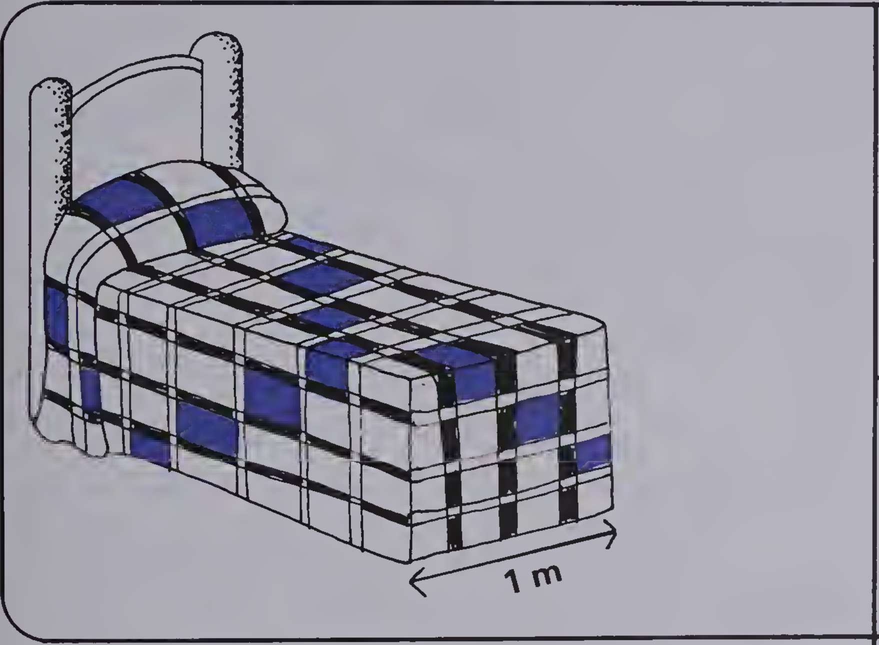
How many kilometres are there in 3875 m?
1000 m = 1 km
3875 m = (3875 ÷ 1000) km
3875 m = 3.875 km

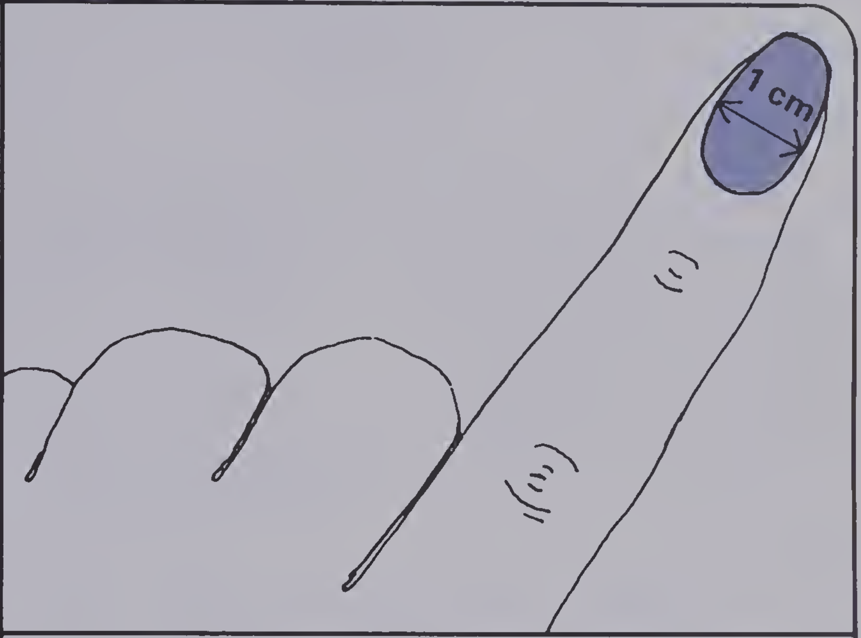
IN ACTION

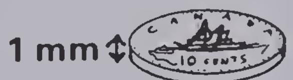
1. Complete.
   a) 5 km = ? m
   b) 1000 m = ? km
   c) 5.123 km = ? m
   d) 892 m = ? km
   e) 17 km = ? m
   f) 3000 m = ? km
   g) 975 m = ? km
   h) 7.004 km = ? m
   i) 5500 m = ? km
   j) 10.5 km = ? m
   k) 1.2 km = ? m
   l) 1115 m = ? km
   m) 1 km = ? m
   n) 10 000 m = ? km
   o) 6.8 km = ? m
   p) 3700 m = ? km
   q) 1295 m = ? km
   r) 1050 m = ? km

2. Complete the following sentences by using the correct symbol, > or < or = .
   a) 2 m ? 387 cm
   b) 2 km ? 5000 m
   c) 17 mm ? 13 cm
   d) 1700 mm ? 1 m
   e) 1.65 m ? 200 cm
   f) 7.8 km ? 7815 m
   g) 1.6 cm ? 22 mm
   h) 1.59 km ? 1590 m
   i) 235 cm ? 2.35 m

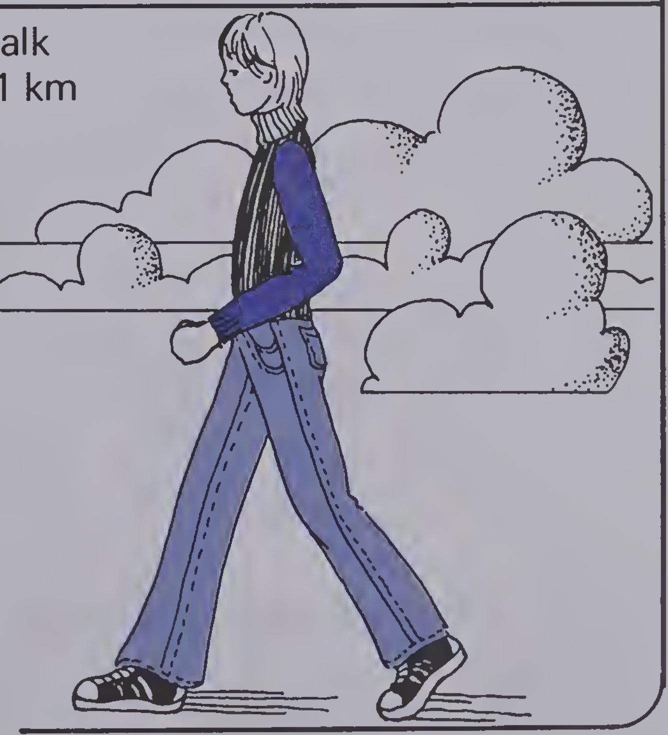
3. Think about these units — the kilometre, the metre, the centimetre, the millimetre.



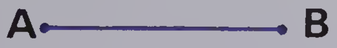




12 min walk
is about 1 km



Which unit would you choose to measure
a) the length of your finger
b) the width of your finger
c) the distance between Charlottetown and Summerside
d) the length of this line segment



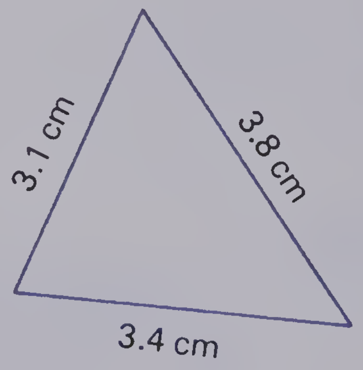
e) the length of your room
f) the length of your bed
g) the length of a cat's tail
h) your height?

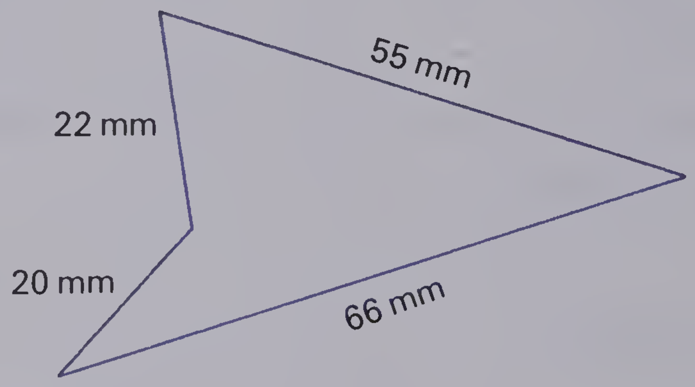
4. Arrange the following lengths in order from least to greatest.
   a) 66 cm, 132 mm, 9 cm, 135 cm, 1 m, 92 mm
   b) 735 m, 1 km, 9000 cm, 1023 m, 1576 cm, 10 m
   c) 1.6 km, 1750 m, 13.8 cm, 152 mm, 17.39 m, 2536 cm
   d) 8000 cm, 32.5 m, 0.95 km, 1000 m, 900 m
   e) 77 mm, 3.5 cm, 0.39 m, 1372 cm, 2.5 m, 900 mm

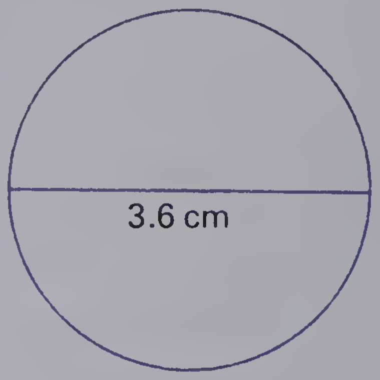
5. Draw line segments having these lengths.
   Record the length on each line segment. Name each line segment.
   a) 17 mm b) 3.5 cm c) 0.01 m d) 0.13 m e) 0.2 cm
   f) 33 mm g) 7.8 cm h) 14.5 cm i) 9 mm j) 0.08 m

6. Express the length of the line segment you drew in:
   a) 5 a) in centimetres b) 5 b) in millimetres
   c) 5 c) in centimetres d) 5 d) in centimetres
   e) 5 e) in millimetres f) 5 f) in centimetres
   g) 5 g) in millimetres h) 5 h) in millimetres
   i) 5 i) in centimetres j) 5j) in centimetres

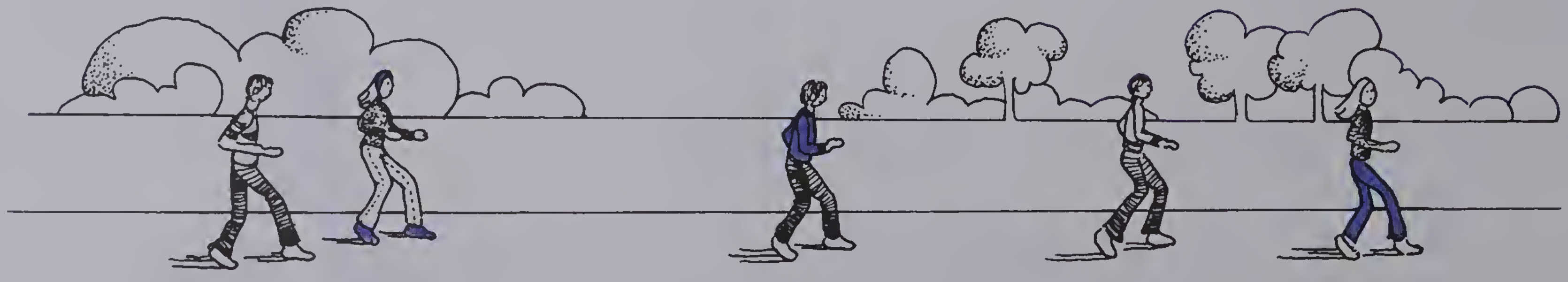
7.







a) Express the distance around the triangle in millimetres.
b) Express the distance around the quadrilateral in centimetres.
c) Express the length of the diameter of the circle in millimetres.



8. Corrie and Kevin jogged 300 m on Monday, 700 m on Tuesday, 500 m on Wednesday, and 400 m on Thursday. Express in kilometres the total distance they jogged.

Retrace Your Steps

1. Tell how you would draw each figure and another figure congruent to each.
   a) a line segment b) a circle c) a square d) a rectangle

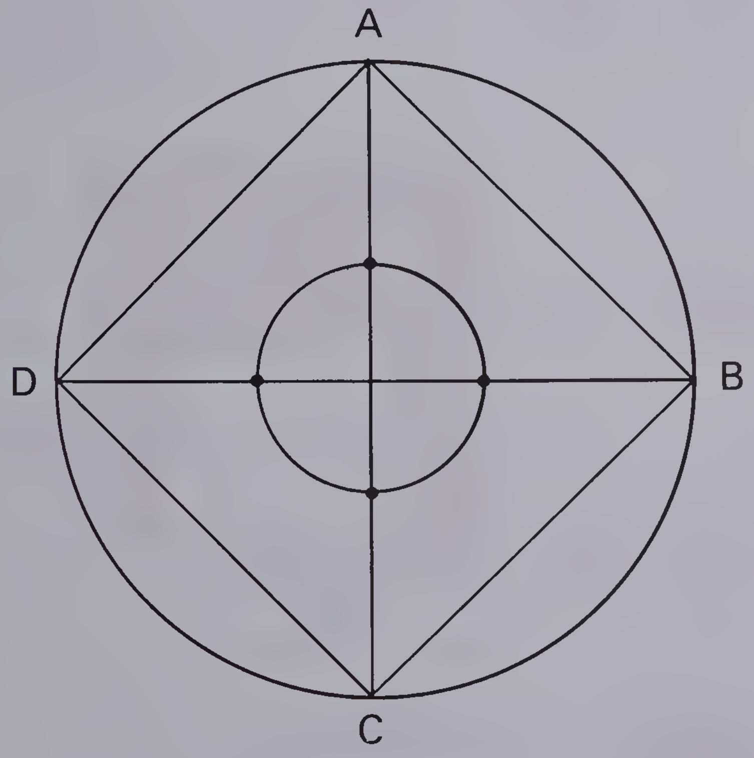
2. Draw a simple closed curve.

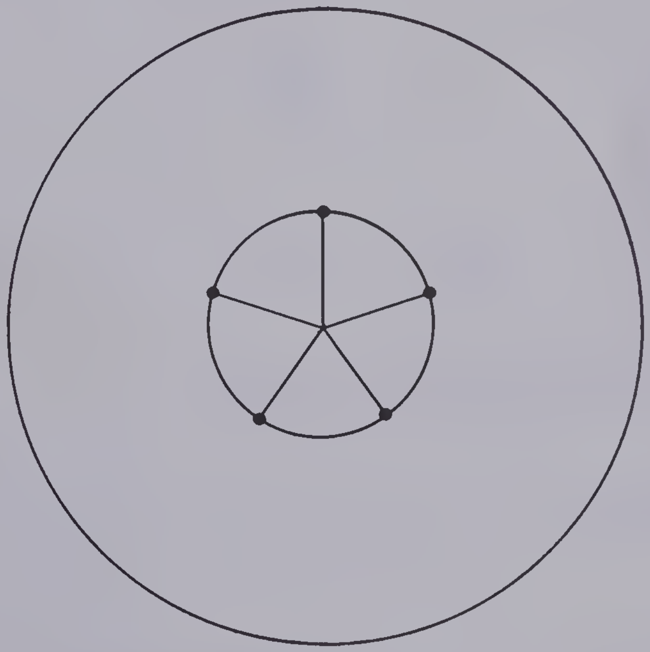
3. Draw a simple closed curve which has:
   a) 3 line segments b) 4 line segments c) 5 line segments
   Name each figure using capital letters.

4. Draw an open curve.

5. Draw an open curve which has:
   a) 3 line segments b) 4 line segments c) 5 line segments
   Name each figure using capital letters.

6. Draw 2 large circles by drawing around a circular object. Draw an inner circle for each by drawing around a coin or counter.
   Mark the inner circles as shown. Complete the figures.

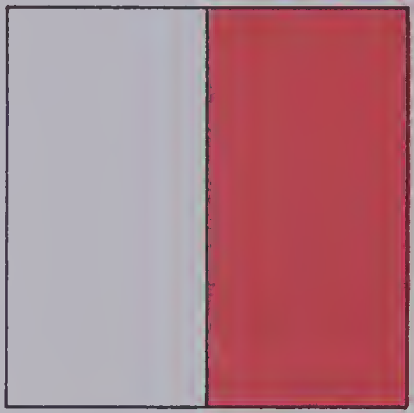




The first one is completed.
Measure the length of each side of the large polygon in millimetres.

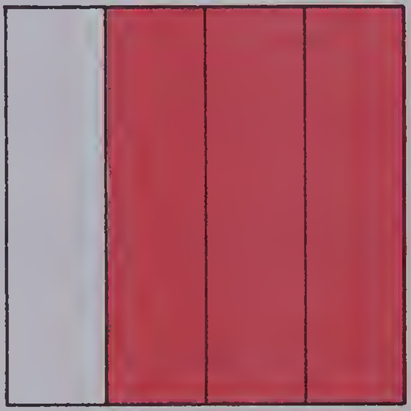
EXPLORE

FRACTIONS/ Parts of a Whole



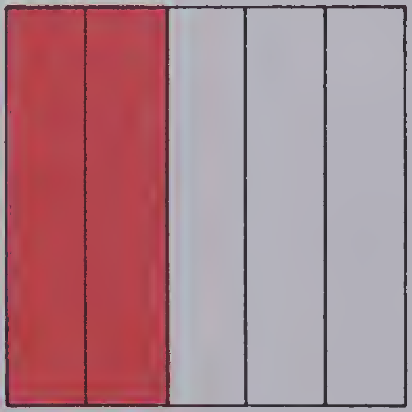
1 square
2 equal parts
Each part shows $\frac{1}{2}$

The shaded part shows $\frac{1}{2}$



1 square
4 equal parts
Each part shows $\frac{1}{4}$

The shaded part shows ?

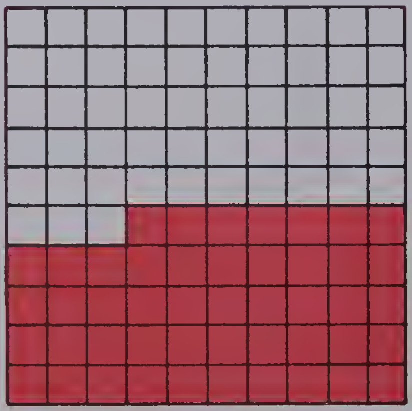


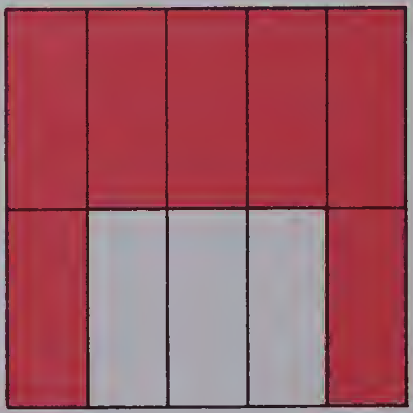
1 square
5 equal parts
Each part shows ?

The shaded part shows ?

1 square
? equal parts
Each part shows ?

The shaded part shows ?



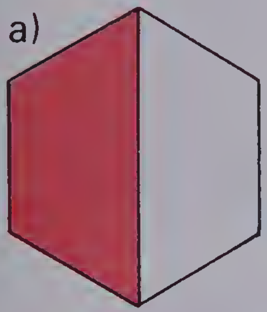


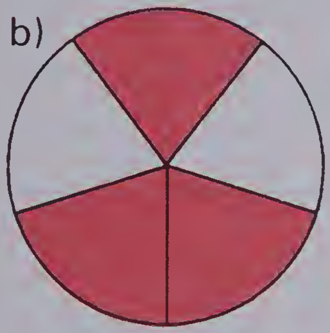
1 square
? equal parts
Each part shows ?

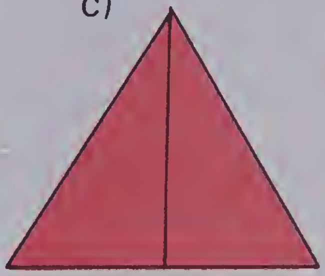
The shaded part shows ?

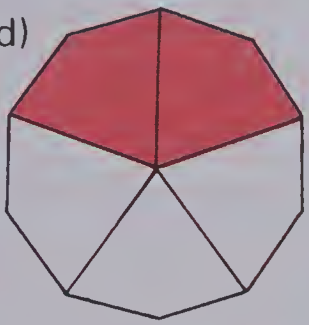
IN ACTION

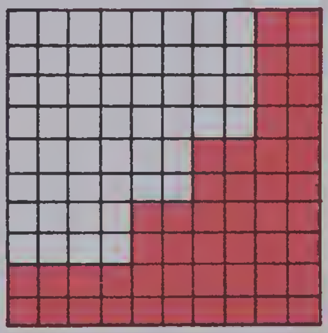
1. For each diagram:
   - i) give the number of equal parts
   - ii) write the fraction that each part shows
   - iii) write the fraction that shows what part is shaded

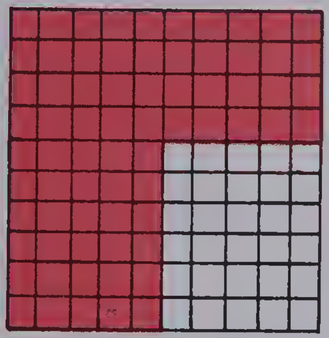
a)


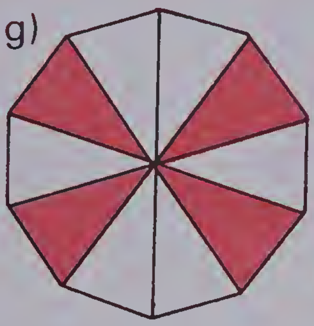
b)


c)


d)


e)


f)


g)


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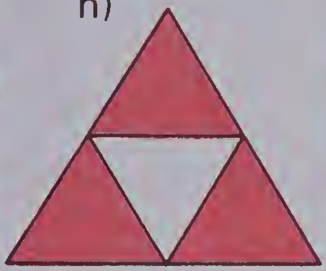
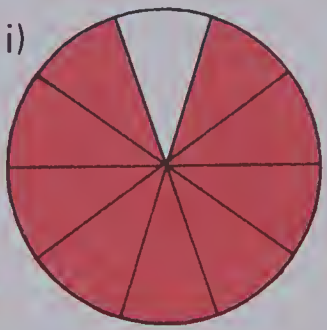
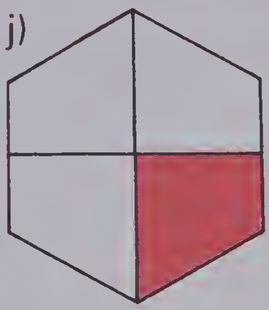
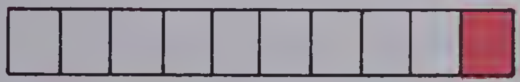
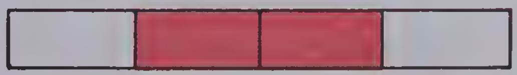


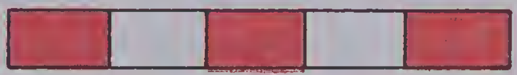
i)


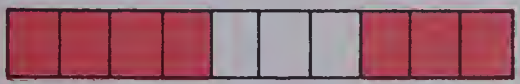
j)


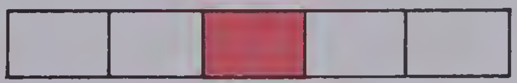
2. What fraction is shaded?

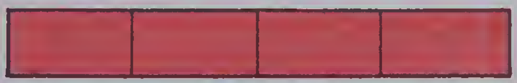
a)


b)


c)


d)


e)


f)


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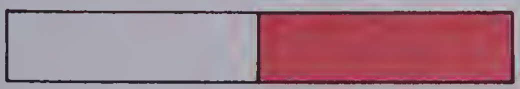

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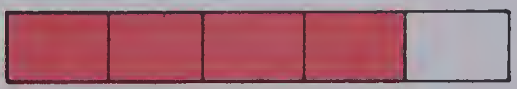

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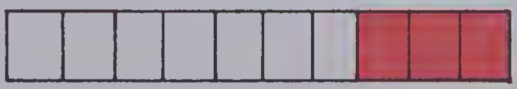

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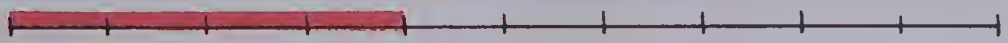
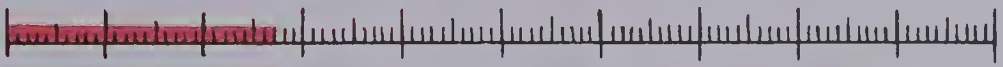
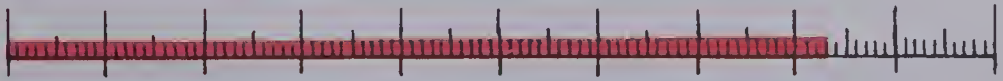


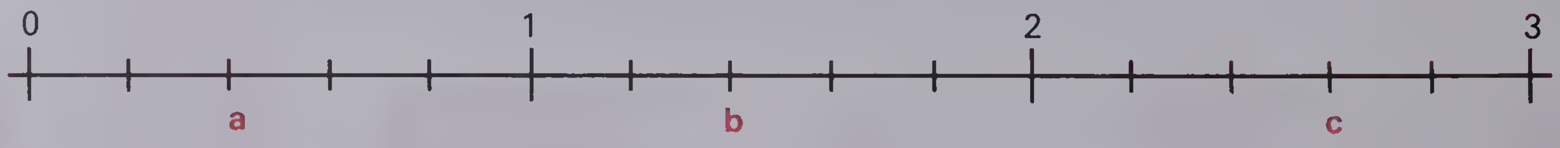
k)


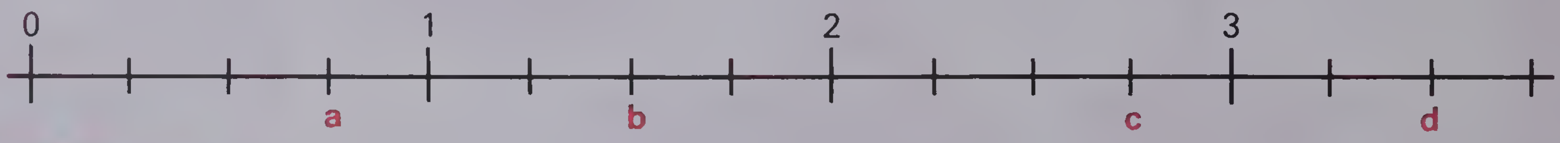
l)


Fractions Greater Than 1

Write the fraction for each point named by a letter.

Record this way: $a \longrightarrow \frac{2}{5}$.

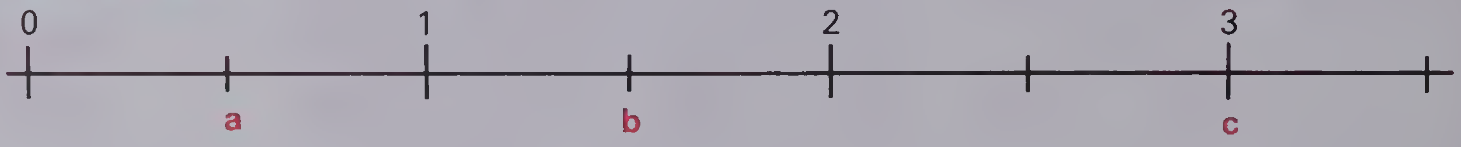




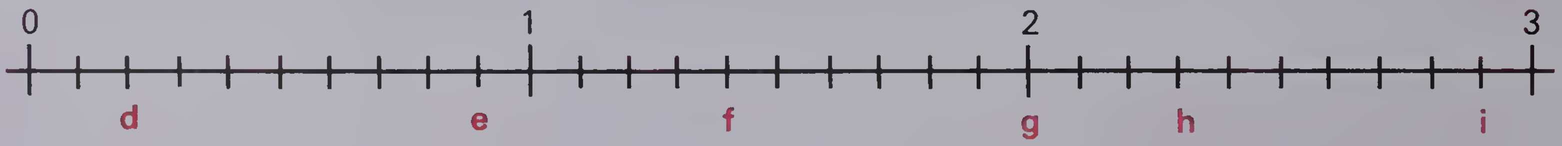
IN ACTION

What fractions are named?

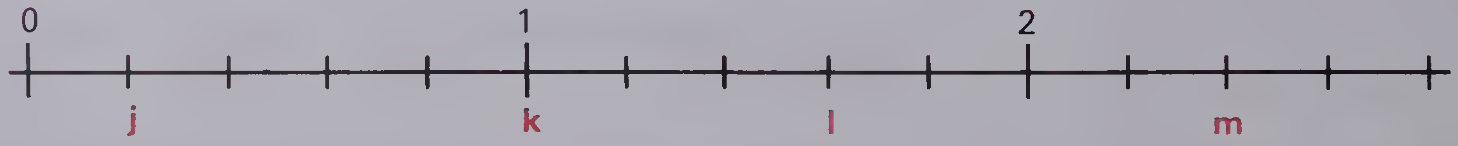
1.



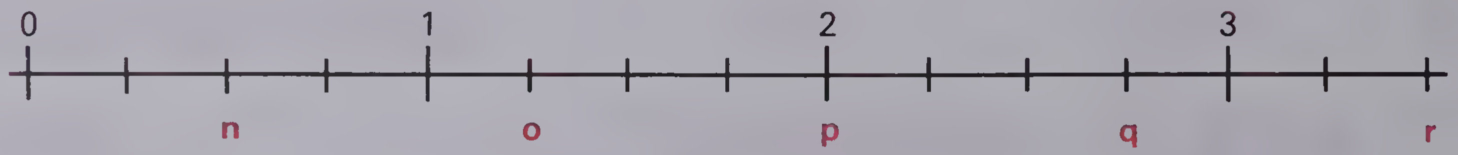
2.


0
1
2
3
d
e
f
g
h
i

3.



4.



5. Use a number line to help you find the answers.

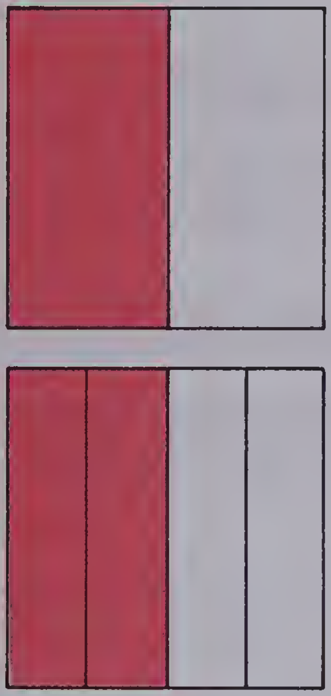
a) $\frac{3}{2} = 1\frac{?}{2}$ b) $\frac{?}{10} = 2\frac{2}{10}$ c) $\frac{11}{5} = 2\frac{?}{?}$ d) $\frac{?}{4} = 3\frac{1}{4}$

e) $\frac{25}{10} = 2\frac{?}{?}$ f) $\frac{?}{?} = 3\frac{1}{2}$ g) $\frac{9}{4} = ?$ h) $\frac{?}{5} = 2$

Equivalent Fractions

2 different fractions which name the same part of an object are called **equivalent fractions.**

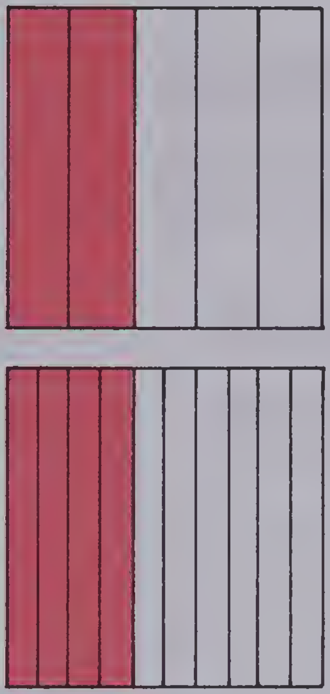
a)



$\frac{1}{2} = \frac{2}{4}$

$\frac{1}{2}$ is equivalent to $\frac{?}{4}$

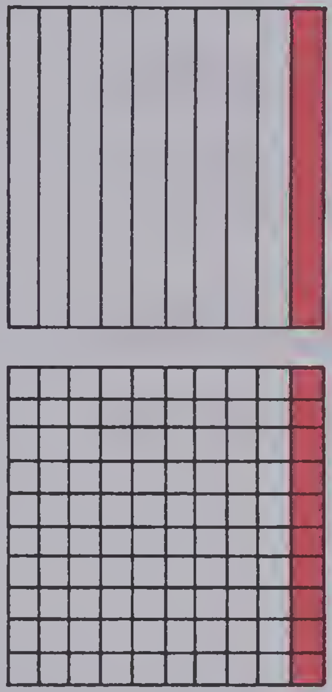
b)



$\frac{2}{5} = ?$

? is equivalent to ?

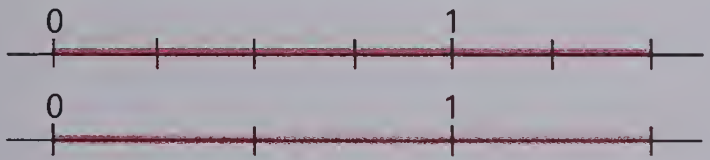
c)



? = ?

? is equivalent to ?

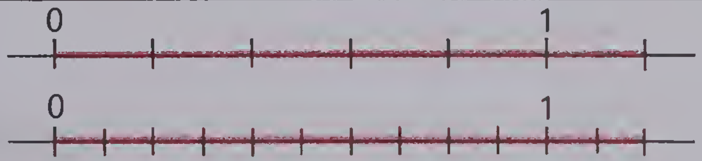
d)



$\frac{6}{4} = \frac{3}{2}$

$\frac{6}{4}$ is equivalent to $\frac{?}{2}$

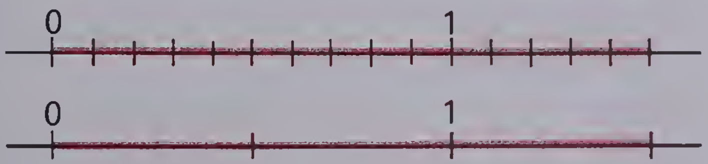
e)



$\frac{6}{5} = ?$

? is equivalent to ?

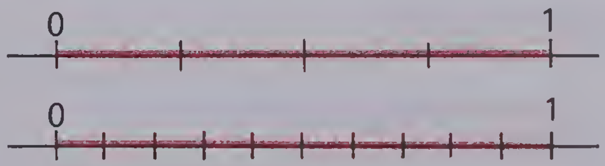
f)



$\frac{?}{10} = ?$

? is equivalent to ?

g)

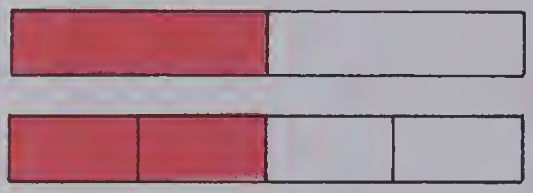


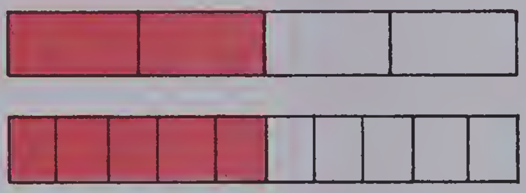
$\frac{?}{?} = \frac{?}{?}$

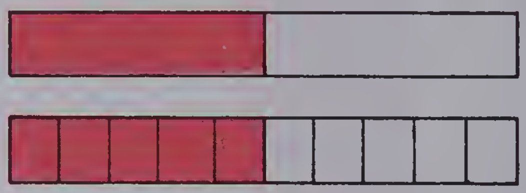
? is equivalent to ?

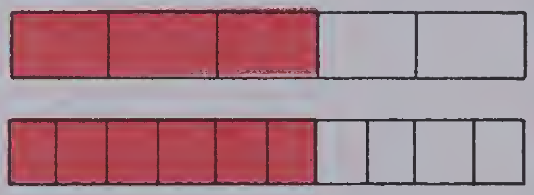
IN ACTION

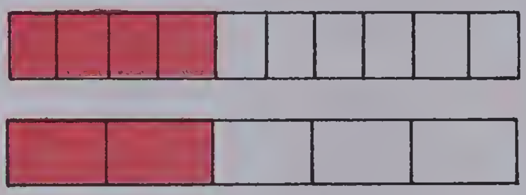
1. Write the equivalent fractions.

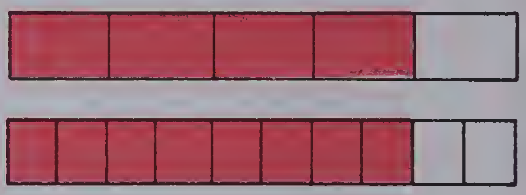
a)


b)


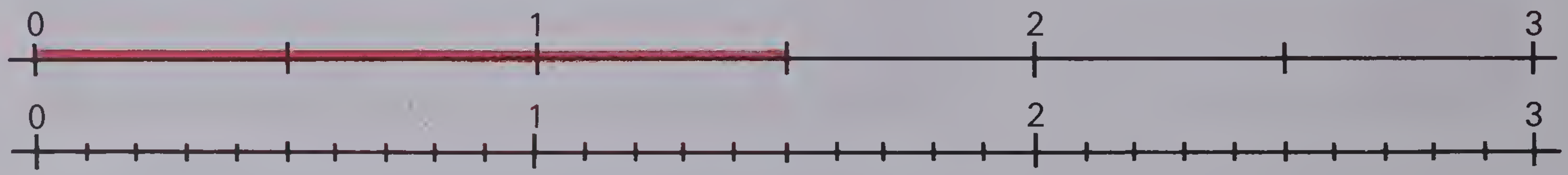
c)


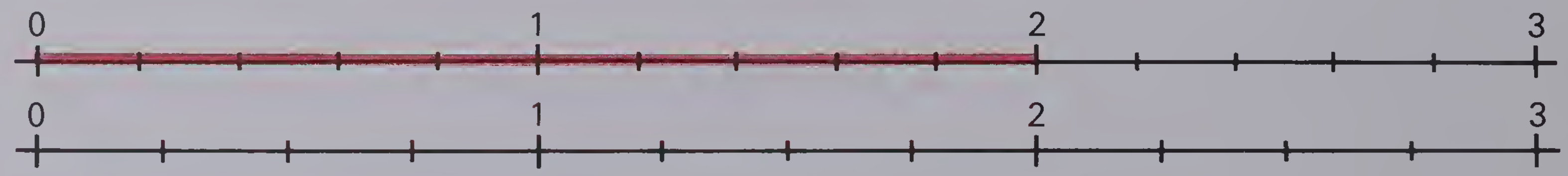
d)


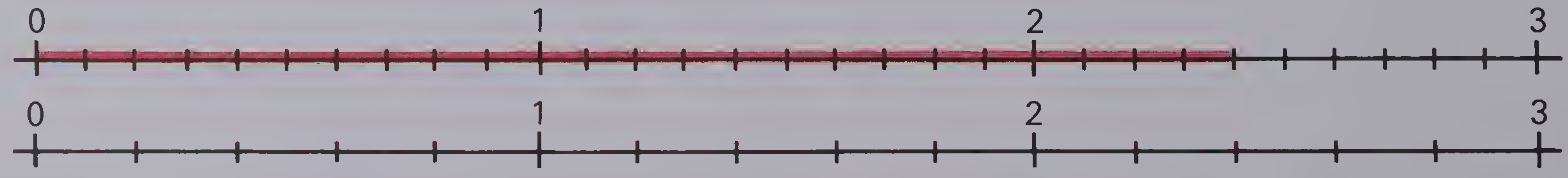
e)


f)


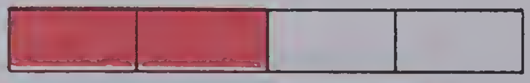
2. Use the number lines to find the equivalent fractions.

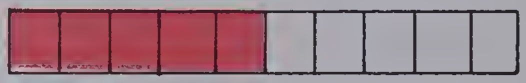
a)


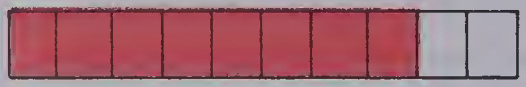
b)


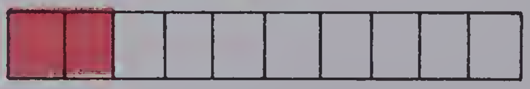
c)


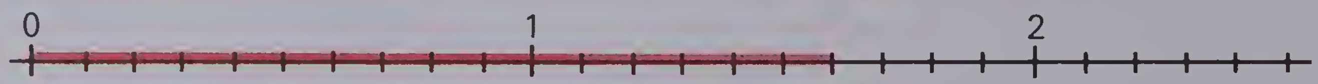
3. Write 2 fractions to show what part is shaded.

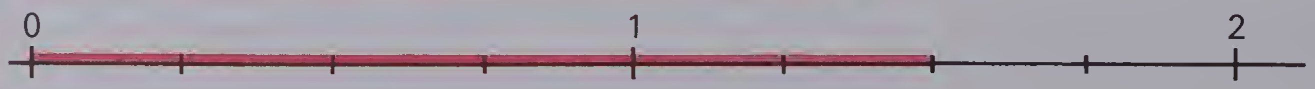
a)


b)


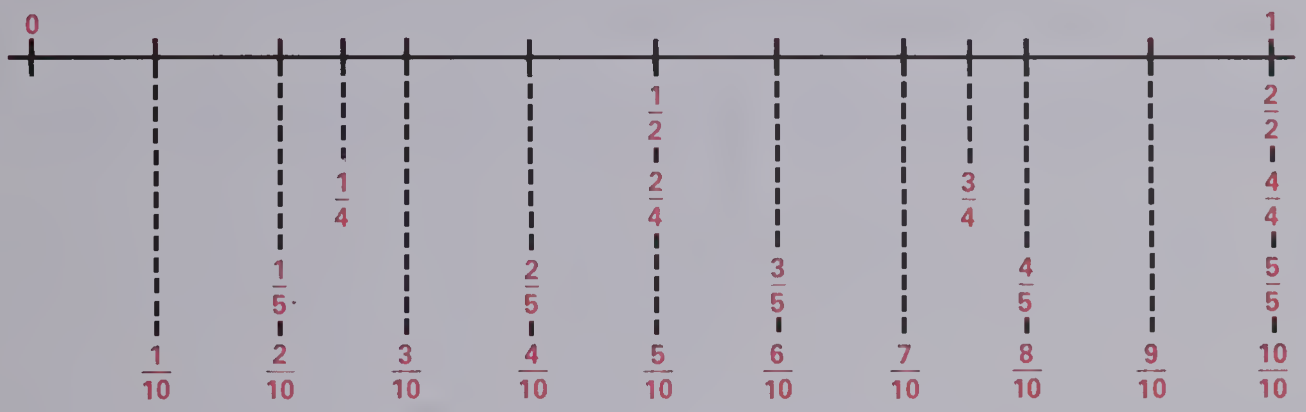
c)


d)


e)


f)


4. Use the diagram to help you find the answers.


0
1
$\frac{1}{10}$
$\frac{1}{5}$
$\frac{2}{10}$
$\frac{1}{4}$
$\frac{3}{10}$
$\frac{2}{5}$
$\frac{4}{10}$
$\frac{1}{2}$
$\frac{2}{4}$
$\frac{5}{10}$
$\frac{3}{5}$
$\frac{6}{10}$
$\frac{7}{10}$
$\frac{3}{4}$
$\frac{4}{5}$
$\frac{8}{10}$
$\frac{9}{10}$
$\frac{2}{2}$
$\frac{4}{4}$
$\frac{5}{5}$
$\frac{10}{10}$

a) $\frac{2}{4} = \frac{?}{2}$ b) $1 = \frac{4}{?}$ c) $\frac{5}{10} = \frac{?}{2}$ d) $1 = ?$ e) $\frac{4}{10} = \frac{2}{?}$

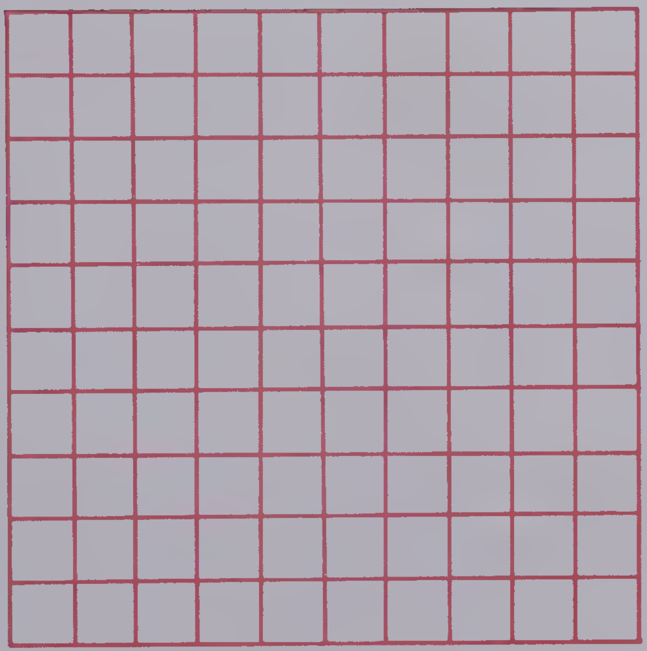
f) $\frac{5}{?} = \frac{4}{4}$ g) $\frac{?}{10} = \frac{4}{5}$ h) $\frac{4}{4} = \frac{?}{2}$ i) $\frac{3}{5} = \frac{6}{?}$ j) $\frac{?}{4} = \frac{10}{10}$

5. Write fractions equivalent to:

a) $\frac{2}{4}$ b) $\frac{8}{10}$ c) $\frac{2}{5}$ d) $\frac{6}{10}$ e) $\frac{2}{2}$ f) $\frac{5}{10}$ g) $\frac{1}{5}$

h) $\frac{3}{2}$ i) $\frac{14}{10}$ j) $\frac{10}{5}$ k) $\frac{6}{5}$ l) $\frac{8}{4}$ m) $\frac{15}{10}$ n) $\frac{8}{5}$

6. Use the diagram to help you find equivalent fractions.



a) $\frac{1}{2} = \frac{?}{100}$

b) $\frac{1}{4} = \frac{?}{100}$

c) $\frac{1}{5} = \frac{?}{100}$

d) $\frac{1}{10} = \frac{?}{100}$

e) $\frac{2}{4} = \frac{?}{100}$

f) $\frac{?}{5} = \frac{40}{100}$

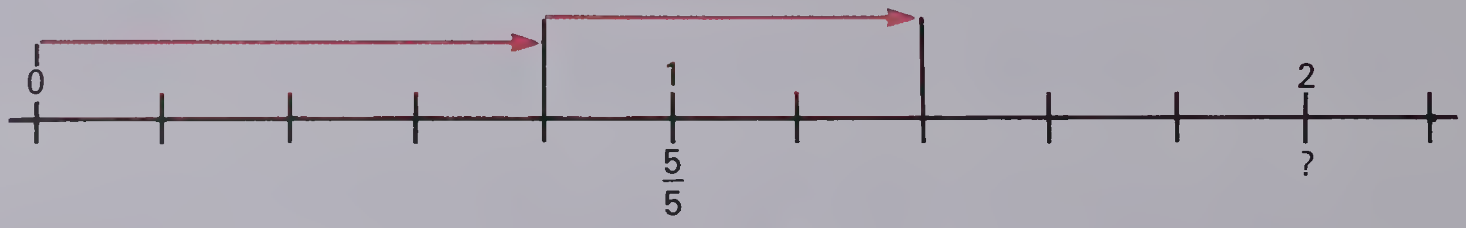
g) $\frac{?}{10} = \frac{30}{100}$

h) $\frac{?}{4} = \frac{75}{100}$

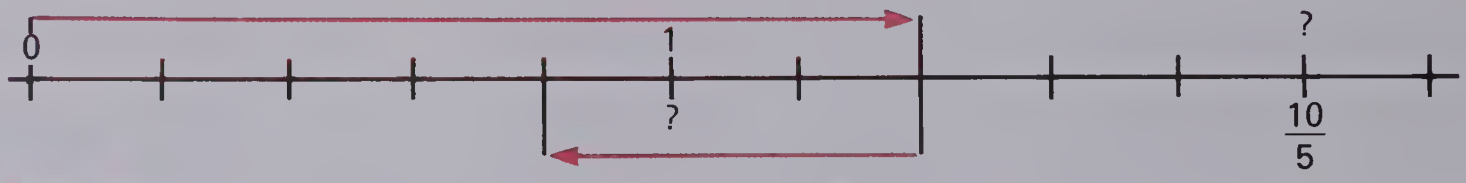
i) $\frac{?}{5} = \frac{80}{100}$

j) $\frac{?}{10} = \frac{50}{100}$

Adding and Subtracting Fractions



$$\frac{4}{5}+\frac{3}{5}=\frac{?}{5}$$
$$=1\frac{?}{5}$$

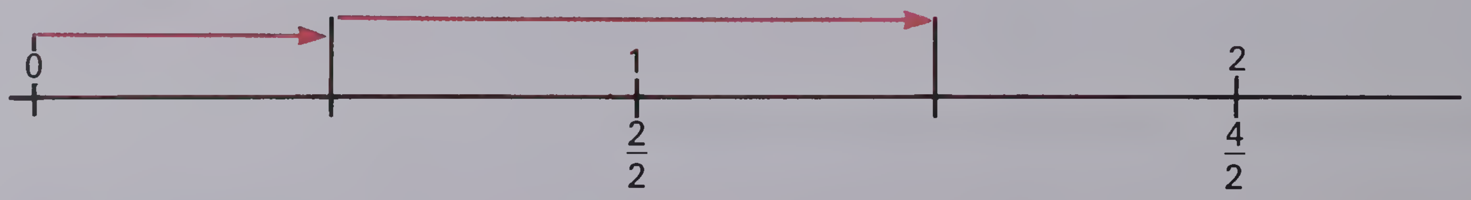


$$\frac{7}{5}-\frac{3}{5}=\frac{?}{5}$$

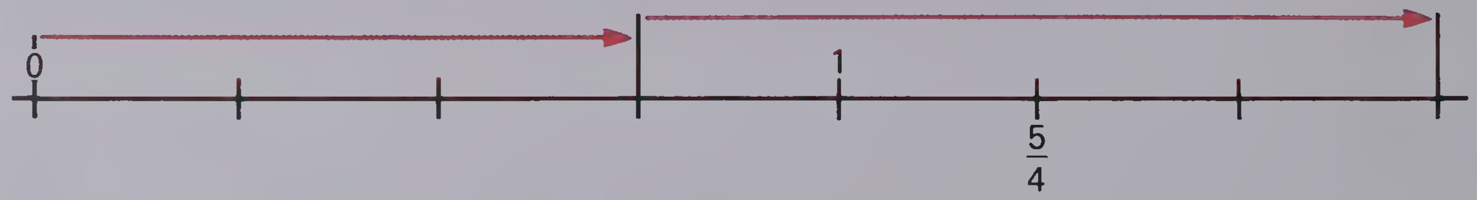
IN ACTION

1. Write an addition sentence for each diagram.

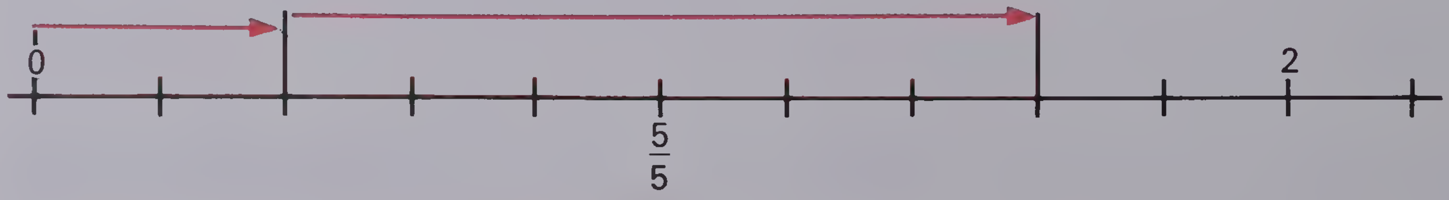
a)


0
1
2
$\frac{2}{2}$
$\frac{4}{2}$

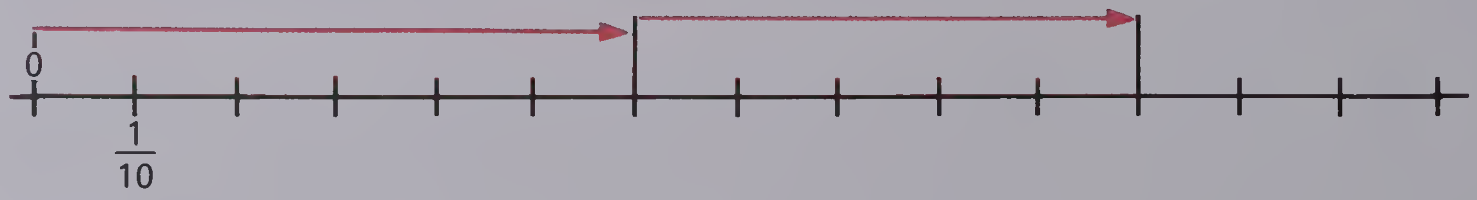
b)



c)

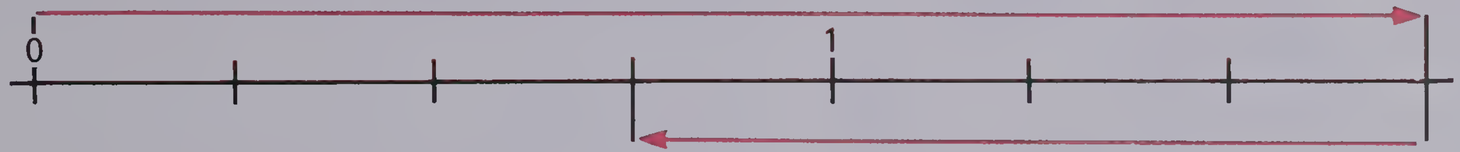


d)

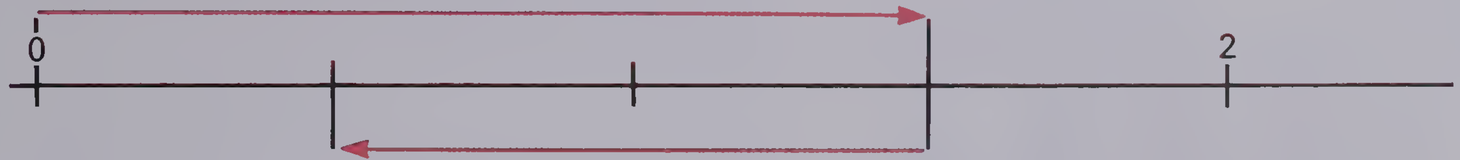


2. Write a subtraction question for each diagram.

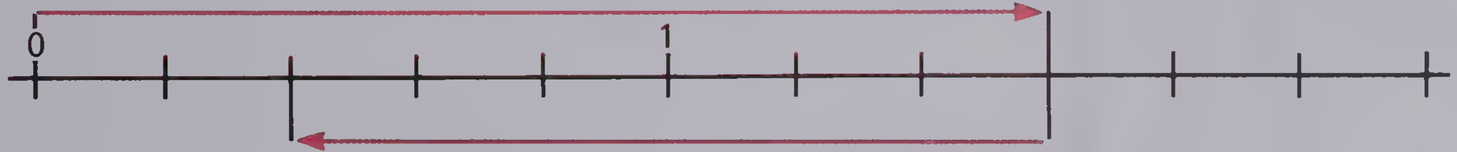
a)



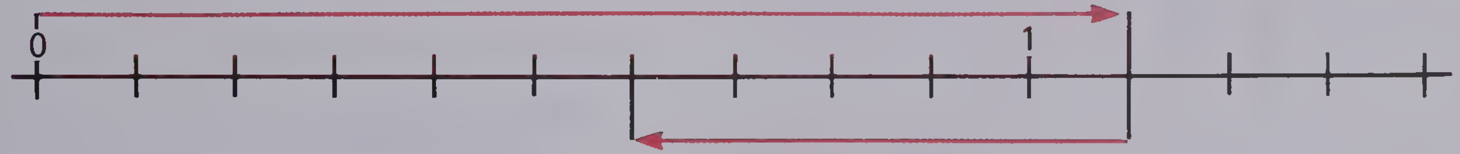
b)



c)



d)



3. Use number lines to find the answers.

a) $\frac{1}{2} + \frac{3}{2}$ b) $\frac{4}{2} - \frac{3}{2}$ c) $\frac{1}{4} + \frac{5}{4}$ d) $\frac{6}{4} - \frac{3}{4}$ e) $\frac{2}{5} + \frac{5}{5}$

f) $\frac{7}{5} - \frac{4}{5}$ g) $\frac{4}{5} + \frac{1}{5}$ h) $\frac{4}{10} + \frac{9}{10}$ i) $\frac{14}{10} - \frac{5}{10}$ j) $\frac{11}{10} - \frac{10}{10}$

4. Add.

a) $\frac{3}{2} + \frac{2}{2}$ b) $\frac{3}{4} + \frac{1}{4}$ c) $\frac{1}{5} + \frac{4}{5}$ d) $\frac{3}{5} + \frac{2}{5}$ e) $\frac{7}{10} + \frac{4}{10}$

5. Subtract.

a) $\frac{4}{2} - \frac{2}{2}$ b) $\frac{5}{4} - \frac{4}{4}$ c) $\frac{6}{5} - \frac{3}{5}$ d) $\frac{12}{10} - \frac{10}{10}$ e) $\frac{8}{4} - \frac{4}{4}$

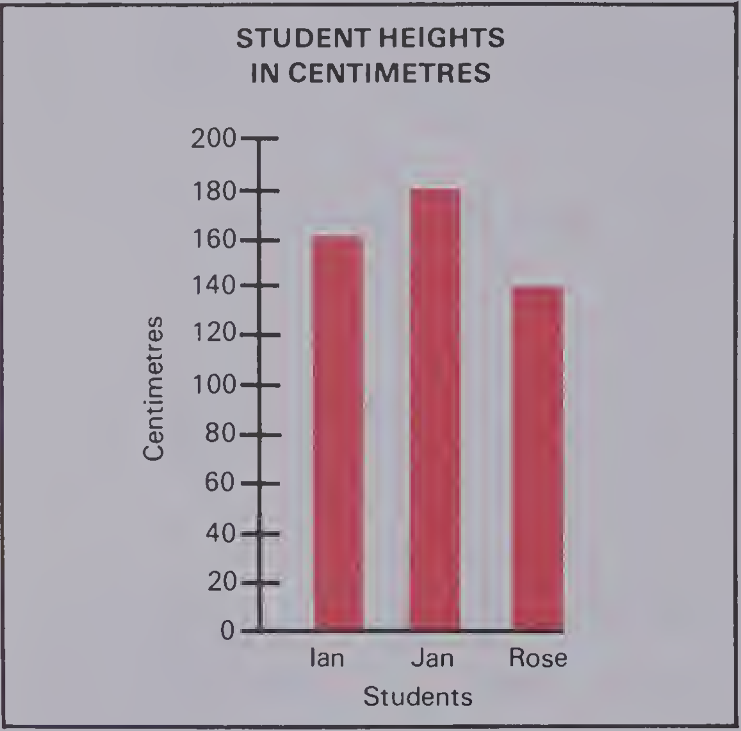
6. Solve.

a) $a = \frac{5}{2} - \frac{2}{2}$ b) $n = \frac{2}{2} + \frac{1}{2}$ c) $f = \frac{2}{4} + \frac{6}{4}$ d) $c = \frac{5}{4} - \frac{1}{4}$ e) $w = \frac{5}{5} + \frac{4}{5}$

f) $p = \frac{8}{5} - \frac{6}{5}$ g) $k = \frac{3}{10} + \frac{8}{10}$ h) $m = \frac{9}{10} - \frac{2}{10}$ i) $y = \frac{5}{10} + \frac{6}{10}$ j) $r = \frac{12}{10} - \frac{10}{10}$

GRAPHS/ Bar Graphs

What can a bar **graph** tell you?



Vertical scale: 1 unit represents 20 cm

A graph is used to compare size.

How much taller than Ian is Jan?

How much shorter than Ian is Rose?

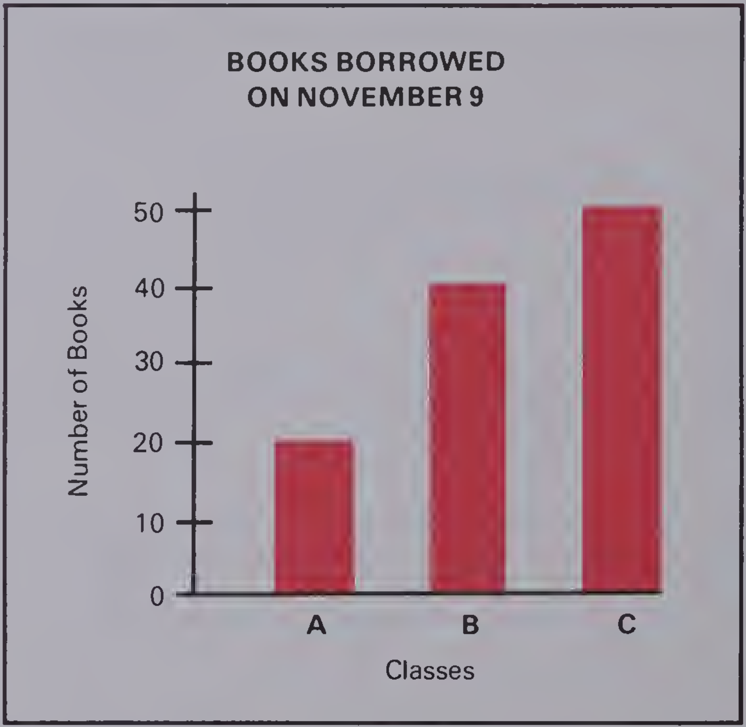
What are some other questions you could ask?

It can answer the question "How many?"

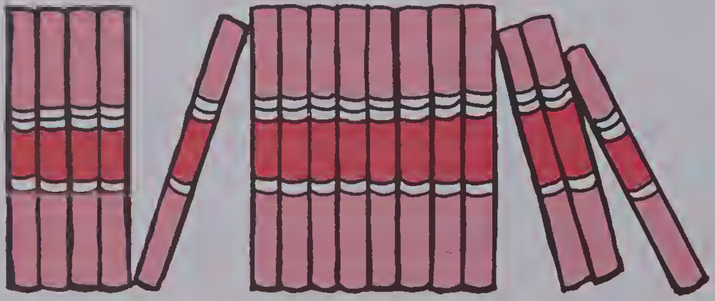
How many books were borrowed from the library on November 9?

How many more books did class B borrow than class A?

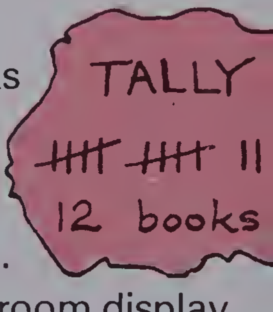
What are some other questions you could ask?



Vertical scale: 1 unit represents 10 books



Make a **tally** to show how many books your class has read this week. Continue the tally for a second week.



Draw a graph for your school librarian. Collect examples of graphs for a classroom display.

5 STEPS:

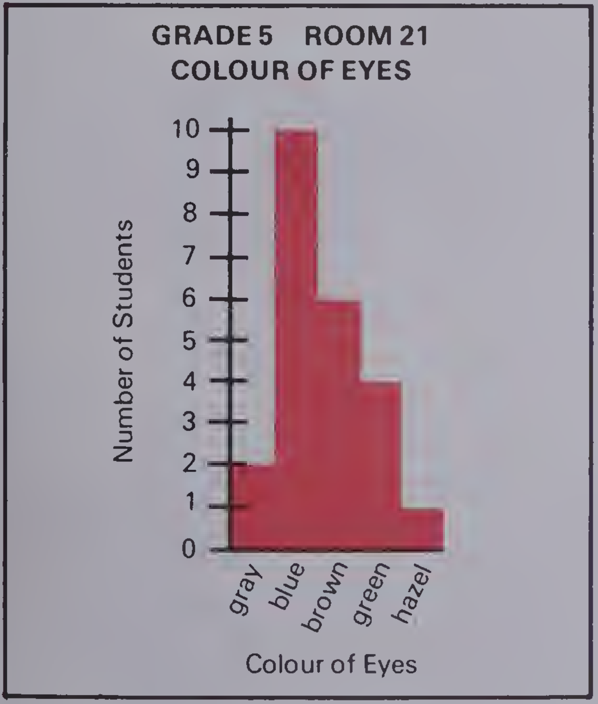
1. Collect the data.
2. Sort and organize data. Use a tally.
3. Draw a graph.
4. Name the graph.
5. Read the graph.

Julie collected this data on the colour of eyes of the students in her Grade 5 class.

She made a tally and a chart.

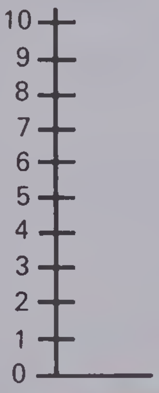
gray	blue	brown	green	hazel
||	𝍸 𝍸	𝍸 |	||||	|
2	10	6	4	1

What questions did Julie ask her class to obtain this information?
How did she use the information to prepare this tally sheet?

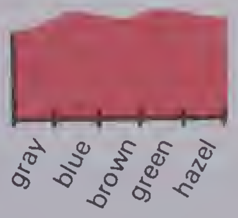


Vertical scale: 1 unit represents 1 student

This is the vertical scale of the graph.
What information is given by this scale?
At what number does the vertical scale begin?

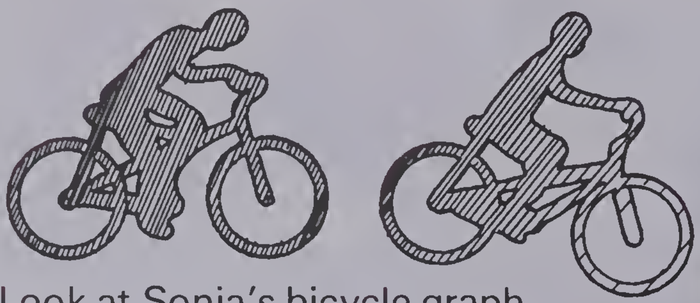


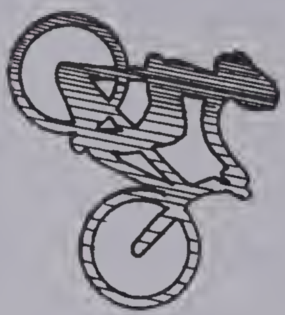
This is the horizontal scale of the graph. What information is given by this scale?



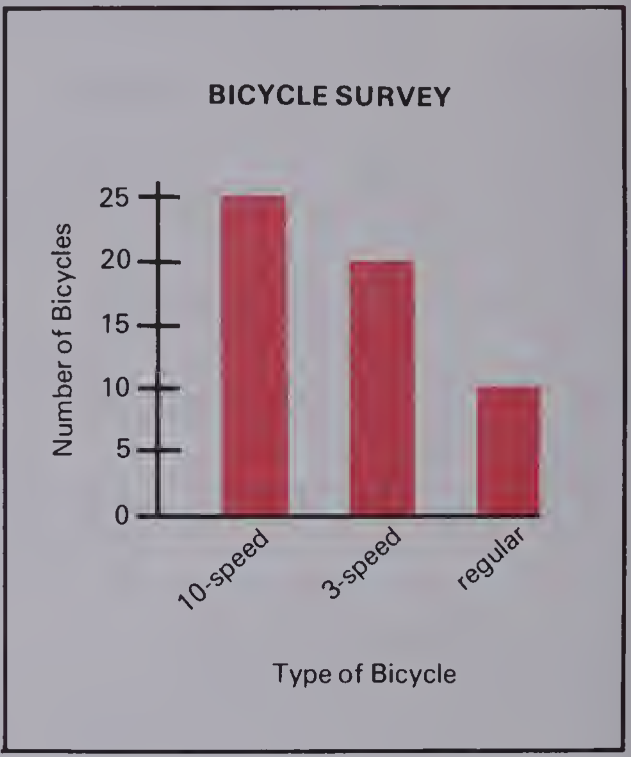
Make up 2 questions that Julie could ask about her graph.

The Vertical Scale / The Horizontal Scale





Look at Sonia's bicycle graph.



Vertical scale: 1 unit represents 5 bicycles

What information does the
vertical scale tell us?
What is the largest number on
the vertical scale?
What is the greatest number of
bicycles that may be found on the graph?

What information does the
horizontal scale tell us?
How does it differ from the vertical scale?

How many 3-speed bicycles are there?
How did you find your answer?

Read the following sets of data.
Draw a vertical and horizontal scale for each one.
Name each scale.

a) school field trips
class A - 4
class B - 6
class C - 2

b) lunches eaten at school
Monday - 4 students
Tuesday - 2 students
Wednesday - 5 students
Thursday - 6 students
Friday - 2 students

Collect data and draw the vertical and horizontal scale for:
a) hair colour of your classmates
b) number of boys and girls in the class
c) 2 more of your choice

IN ACTION

PRIX D'EFFICIENCE PHYSIQUE·FITNESS AWARD·CANADA
FITNESS AWARD·CANADA·PRIX D'EFFICIENCE PHYSIQUE

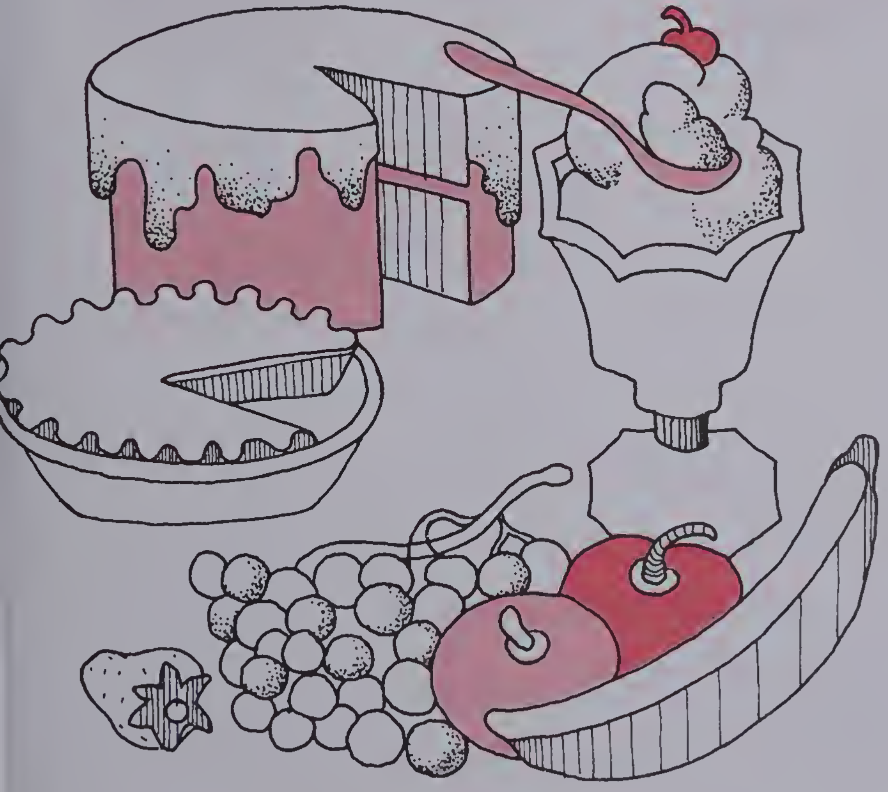
1. John's class is very keen on fitness. The class earned these awards.

   a) Draw and complete this tally sheet and chart.
   b) Build a graph for this data.
   c) Write 2 questions about your graph.

CANADA FITNESS AWARDS			
Bronze	Silver	Gold	Award of Excellence
卌 卌 ||	卌 卌	卌 |	||
12	?	?	?

2. On a memory quiz, André remembered 14 objects. His father remembered 10, his mother 12, his sister 10, and his young brother 4.

   a) Make a tally sheet.
   b) Build a graph for this information.
   c) Write 2 questions about your graph.

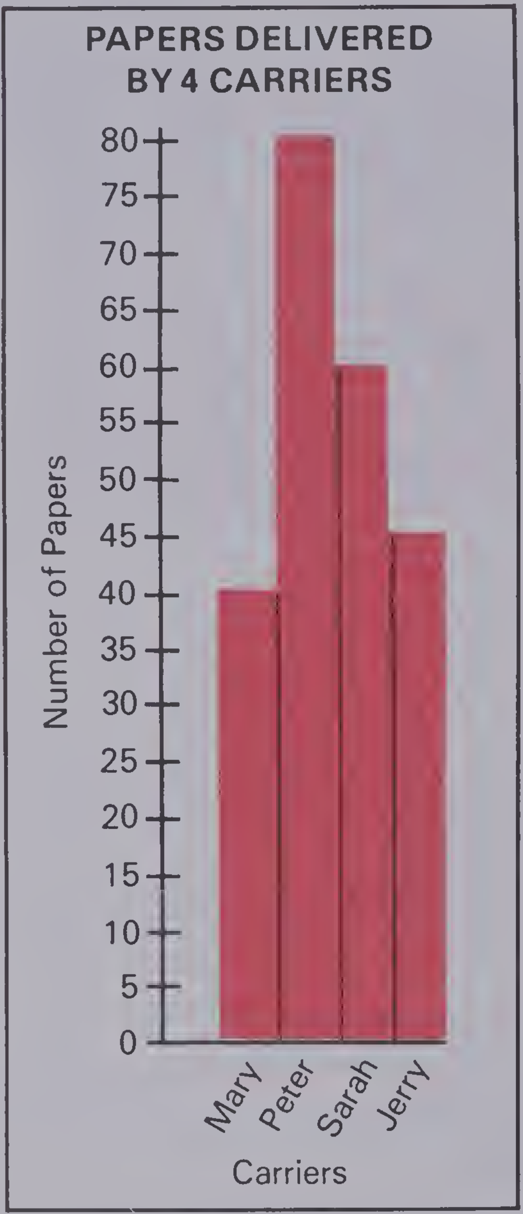


3. Which of these is your favourite dessert? Ask this question of your classmates.

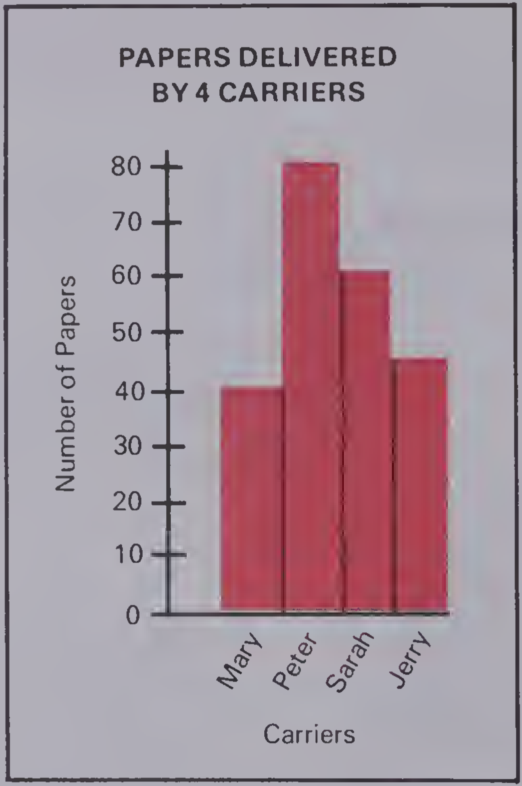
   a) Record their answers on your tally sheet.
   b) Build a graph for this information.
   c) What information is given on your vertical scale?
   d) What information is given on your horizontal scale?
   e) Write 2 questions which ask about information shown on your graph. Have a friend answer your questions.

Scale

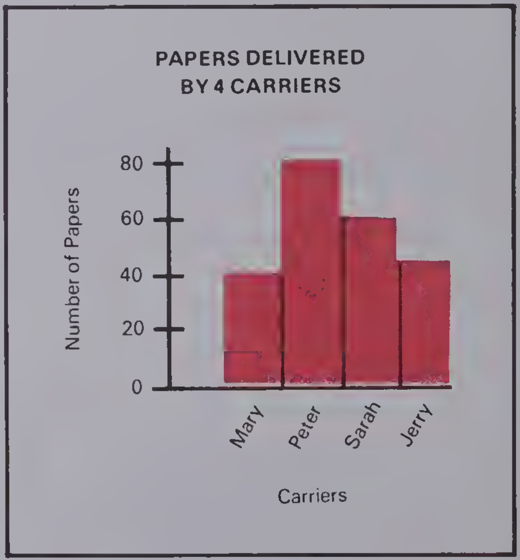
We use different scales.



If 1 unit represents
5 papers, here is the graph.



If 1 unit represents
10 papers, here is the graph.



If 1 unit represents
20 papers, here is the graph.

Which graph would you use for a display on a door?

Which graph would you use for a piece of paper 5 cm by 4 cm?

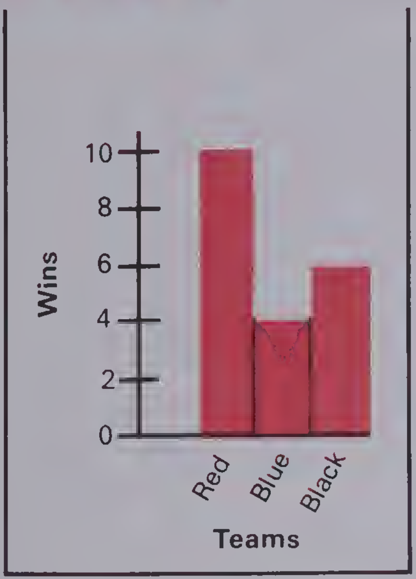
Read each graph to find out how many papers Jerry delivers.
How does a scale help you read a graph?

Why is it necessary to think of a scale when you build a graph?

IN ACTION

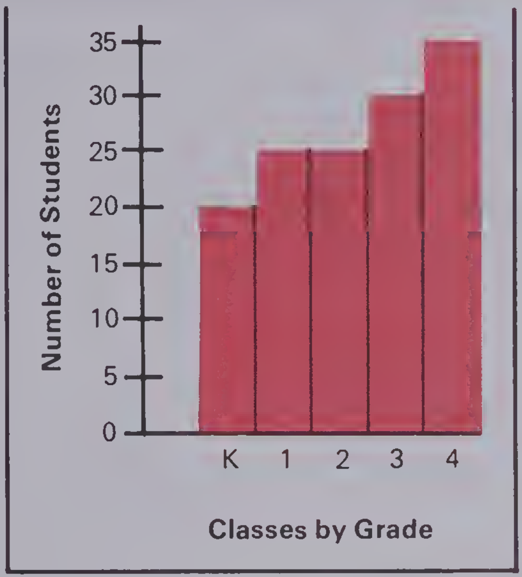
1. What is the vertical scale?

a)



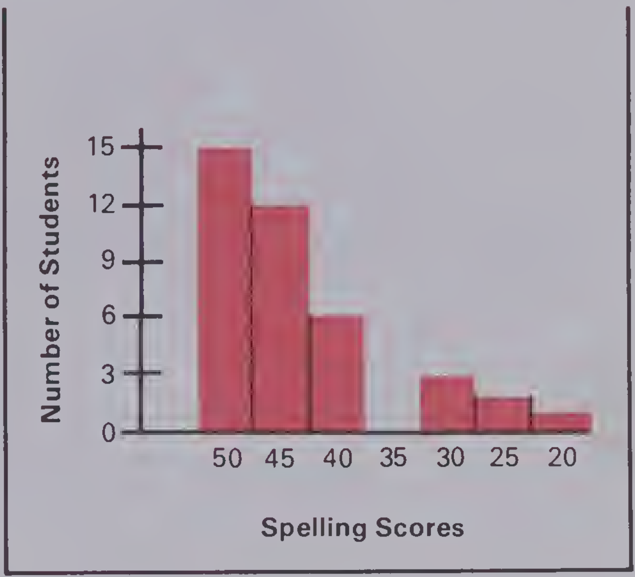
1 unit represents
? win(s)

b)



1 unit represents
? student(s)

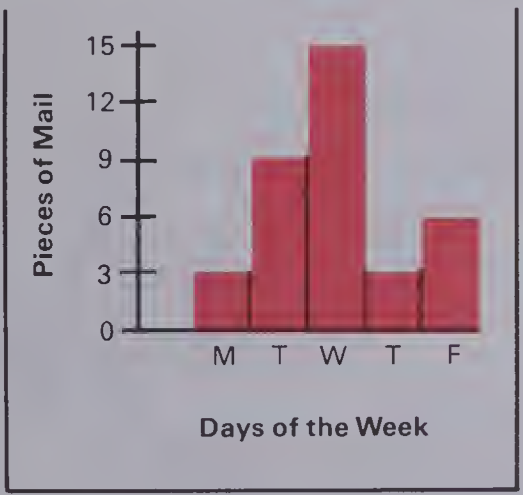
c)



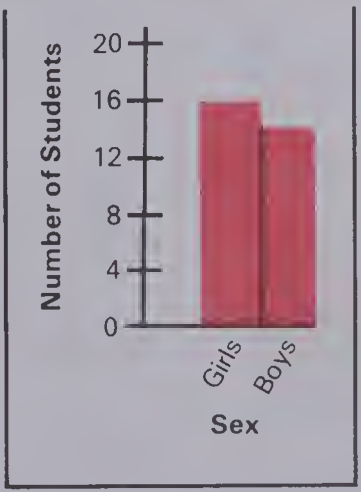
1 unit represents
? student(s)

2. What does the horizontal scale represent in each graph?

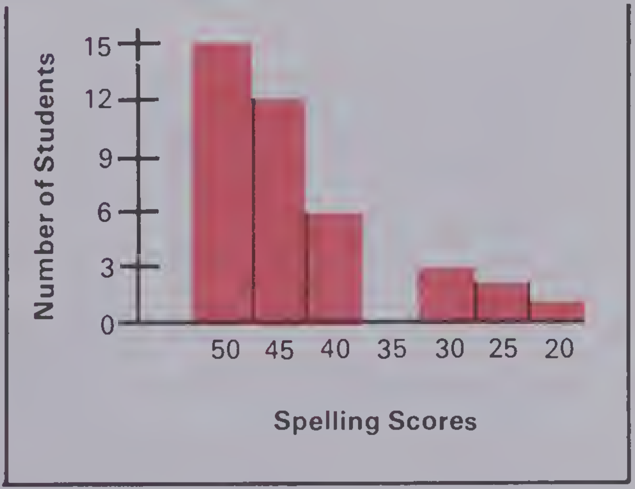
a)



b)



c)



3. a) What scale would you use if the numbers were from 0 to 9?
   b) What scale would you use if the numbers were from 0 to 22?
   c) What scale would you use if the numbers were from 0 to 50?
   d) What scale would you use if the numbers were from 0 to 200?
   e) What scale would you use if the numbers were from 0 to 450?
   f) What scale would you use if the numbers were from 0 to 1000?

4. A class has just made a textbook count for its classroom. This is its tally.

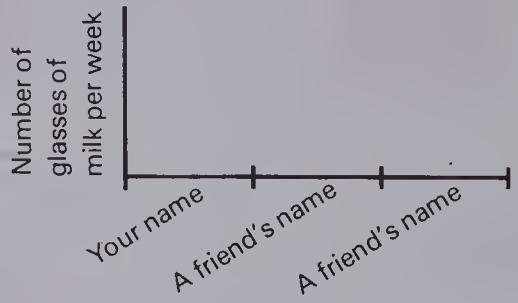
   Draw a graph for this data.

BOOKS	Spellers	*Mathways 5*	Music	Readers	Science
NUMBER	50	50	75	150	25

1 unit represents ? books.

5. In a survey of grade 5 classrooms, the data was:
   100 spellers, 150 *Mathways,* 100 music books, 50 science books.
   What scale would you use to make this graph?

6. How many glasses of milk will you drink today?
   If you drink the same amount every day,
   how many glasses will you drink in 1 week?
   Ask 2 friends these questions.
   Make a tally sheet for the above information.
   Draw a graph. Label your graph like this.



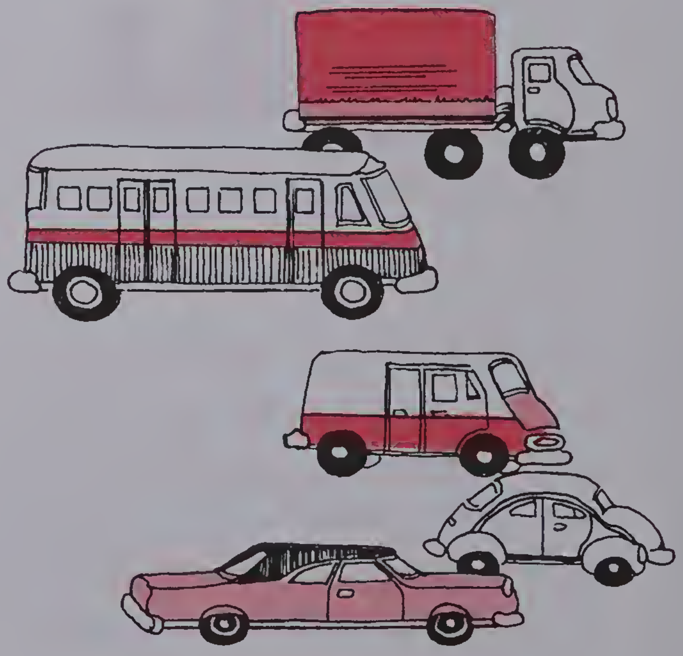
7. Make up your own graphing problem using the scale 1 unit represents 12.

8. **Traffic Survey**
   Record all the different kinds of vehicles which pass your school during a 5 min period.
   Make a tally.
   Draw a graph.
   Read your graph. Write 4 facts that you have learned from your graph.

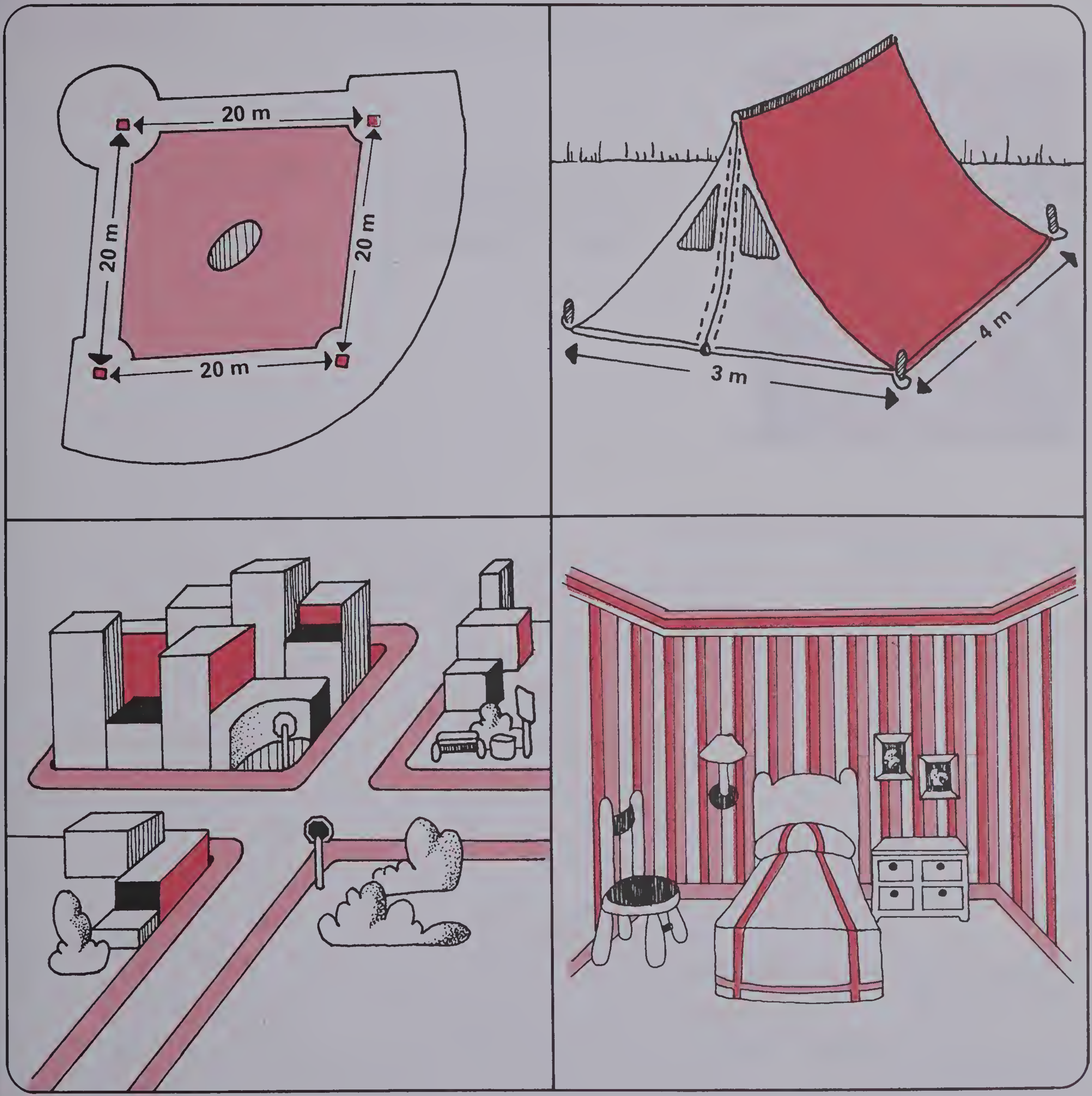
   Make another recording at the same time tomorrow.
   Draw a graph. Read it and compare it with the first.
   Write 4 facts that you have learned for 2 days.

   Continue your survey for a week. What have you learned about the traffic in front of your school?

   Make a graph for traffic at a different time of the day.
   What did you learn?



PERIMETER/ Distance Around

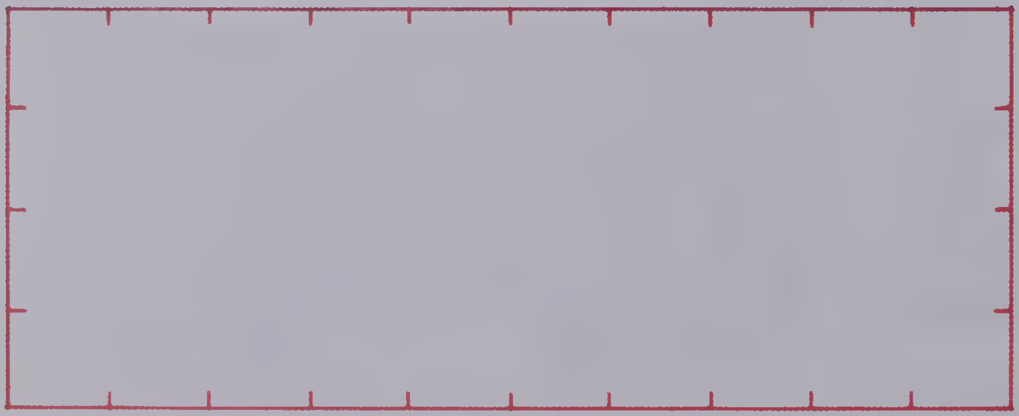

20 m
20 m
20 m
20 m
4 m
3 m

Perimeter

The **perimeter** of an object is the distance around it.

What is the length of your *Mathways 5* textbook?
What is its width?
What is the perimeter of the book?

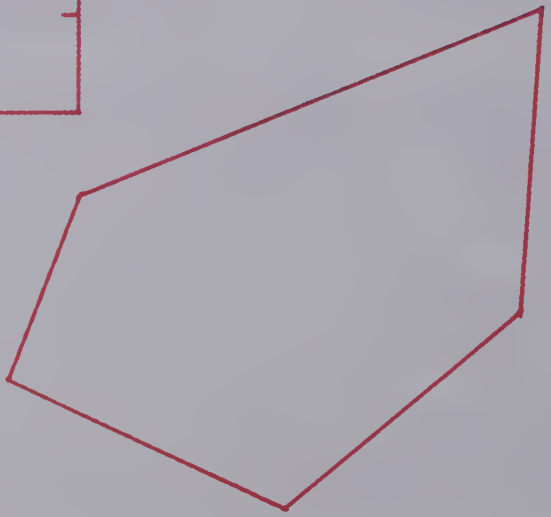
This rectangle is marked in centimetres.
What is its perimeter?



What is the perimeter of this figure?

Draw a rectangle having a perimeter the same length.

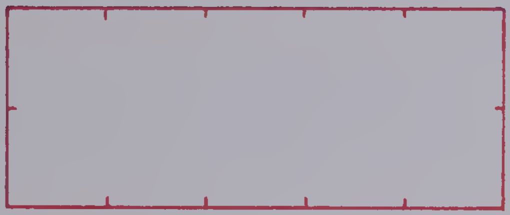
Draw a square having a perimeter the same length.



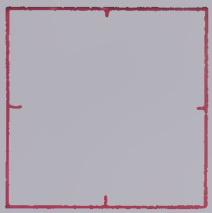
IN ACTION

1. Find the perimeter of each figure.

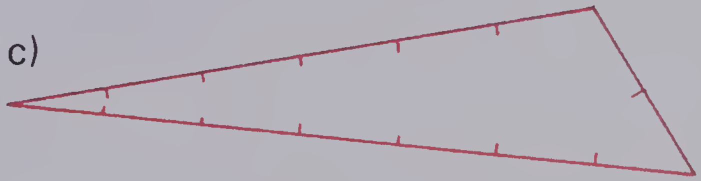
a)



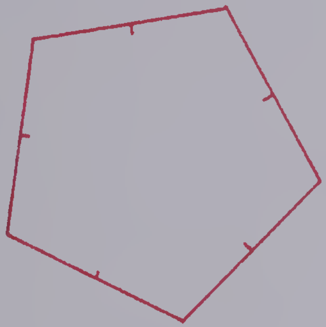
b)



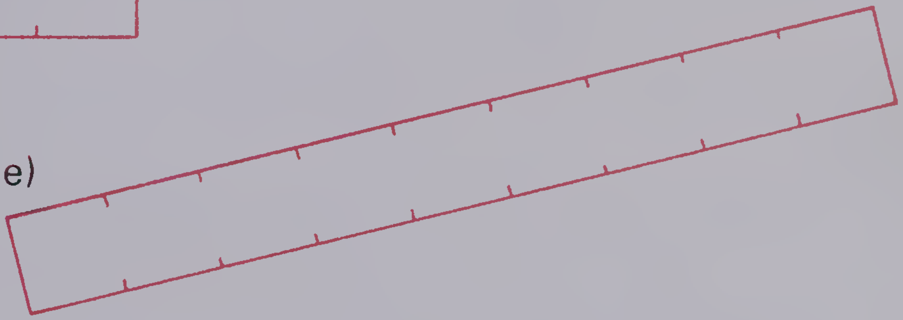
c)



d)

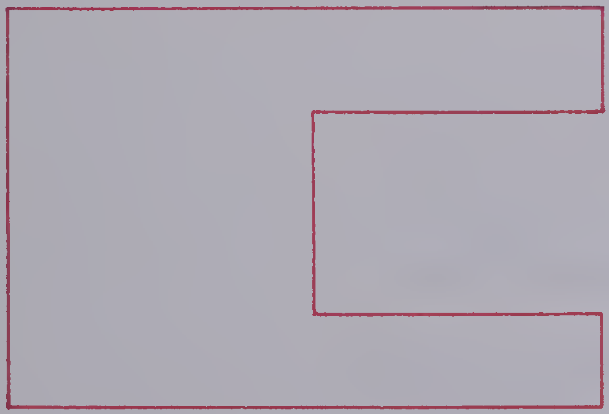


e)

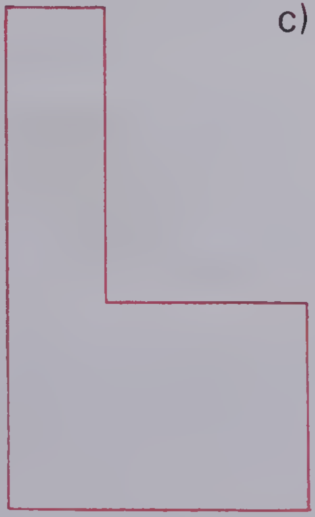


2. Find the perimeter of each figure.
Use a ruler marked in centimetres.

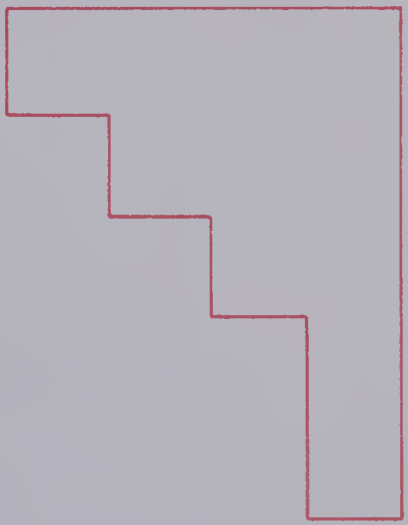
a)



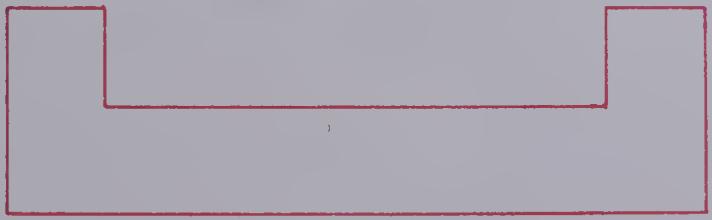
b)



c)

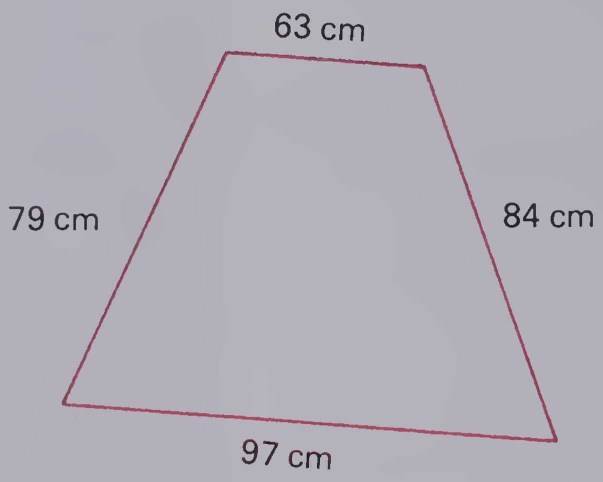


d)

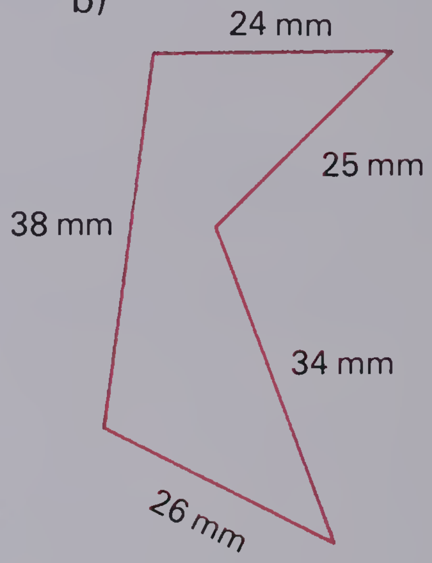


3. Find the perimeter of each figure.
The lengths of the sides are marked for you.

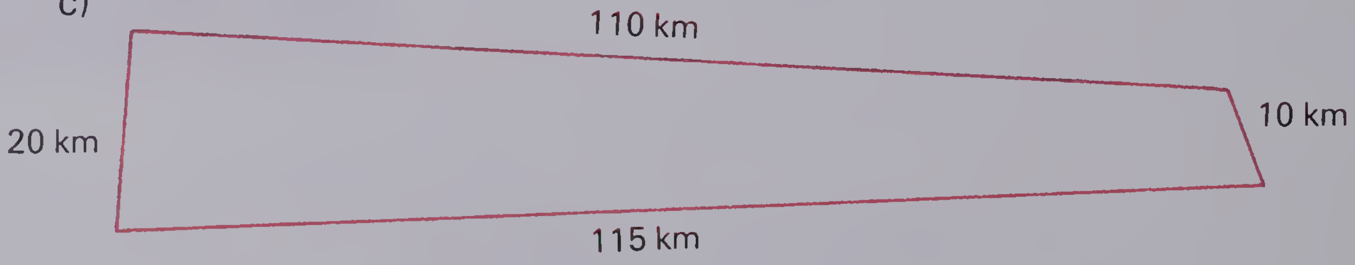
a)


63 cm
79 cm
84 cm
97 cm

b)


24 mm
25 mm
38 mm
34 mm
26 mm

c)

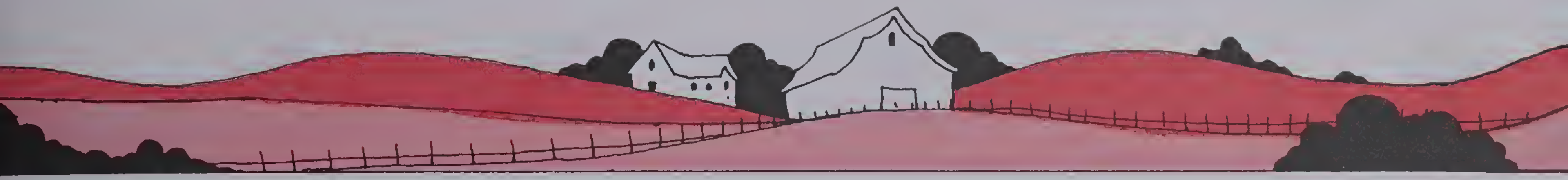

110 km
20 km
10 km
115 km

4. Find the perimeter of:
   - a) your classroom to the nearest metre
   - b) your workbook to the nearest centimetre
   - c) your desk to the nearest centimetre
   - d) a box of crayons to the nearest millimetre

5. a) Draw a rectangle with a perimeter of 18 cm.
What would be the length and width of
a different rectangle having the same perimeter?

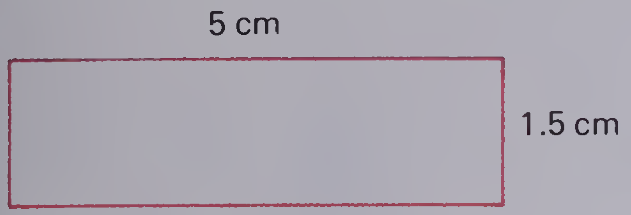
b) Draw several different rectangles,
each having a perimeter of 24 cm.

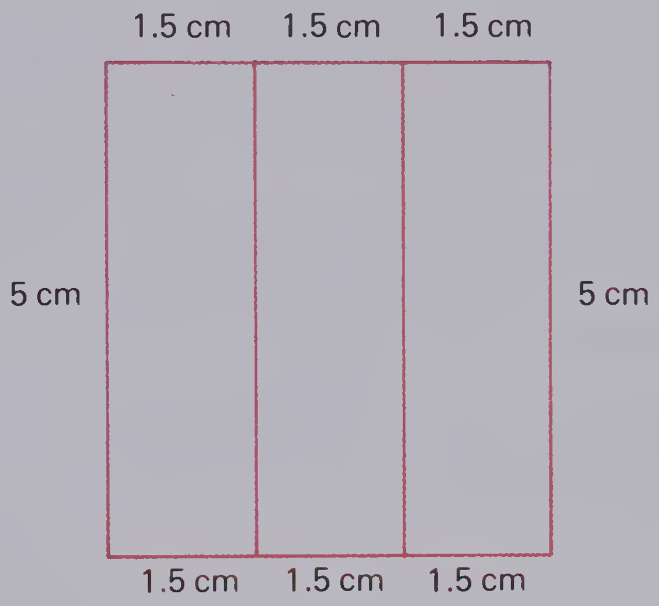
c) Draw a figure with a perimeter of 100 mm.



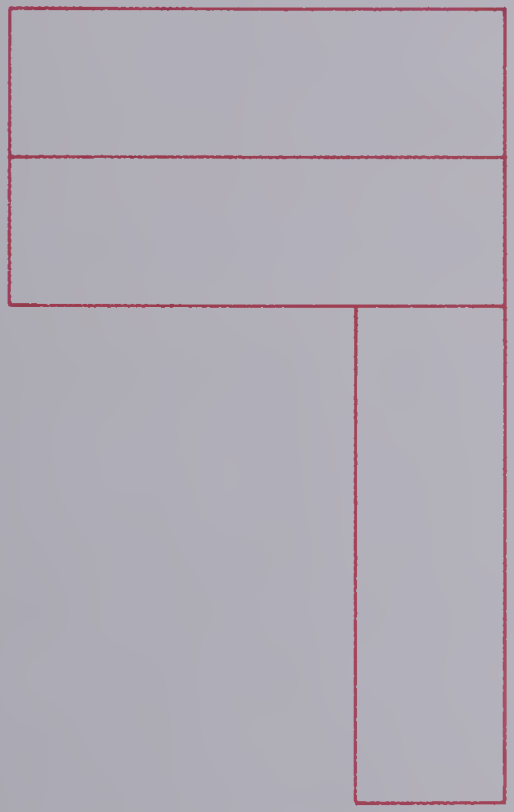
Perimeter

Cut out 3 rectangular regions like this one.



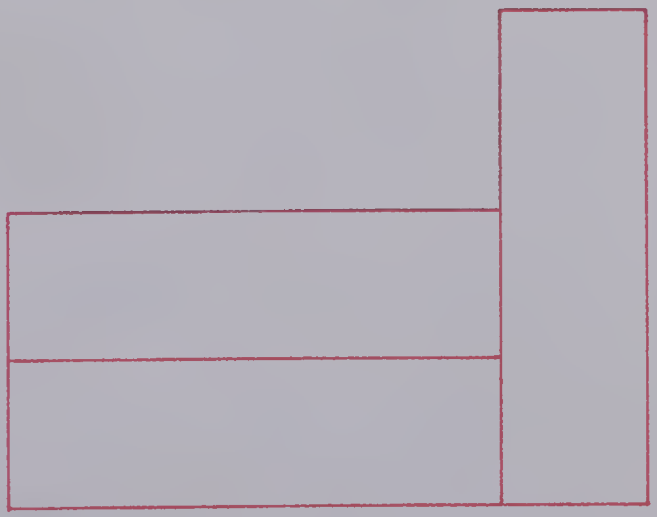

1.5 cm
1.5 cm
1.5 cm
5 cm
5 cm
1.5 cm
1.5 cm
1.5 cm

If you fit them together like this, what is the perimeter of the rectangle?



What is the perimeter of this shape?

What is the perimeter of this shape?



What is the longest perimeter that you can create with the rectangular regions?

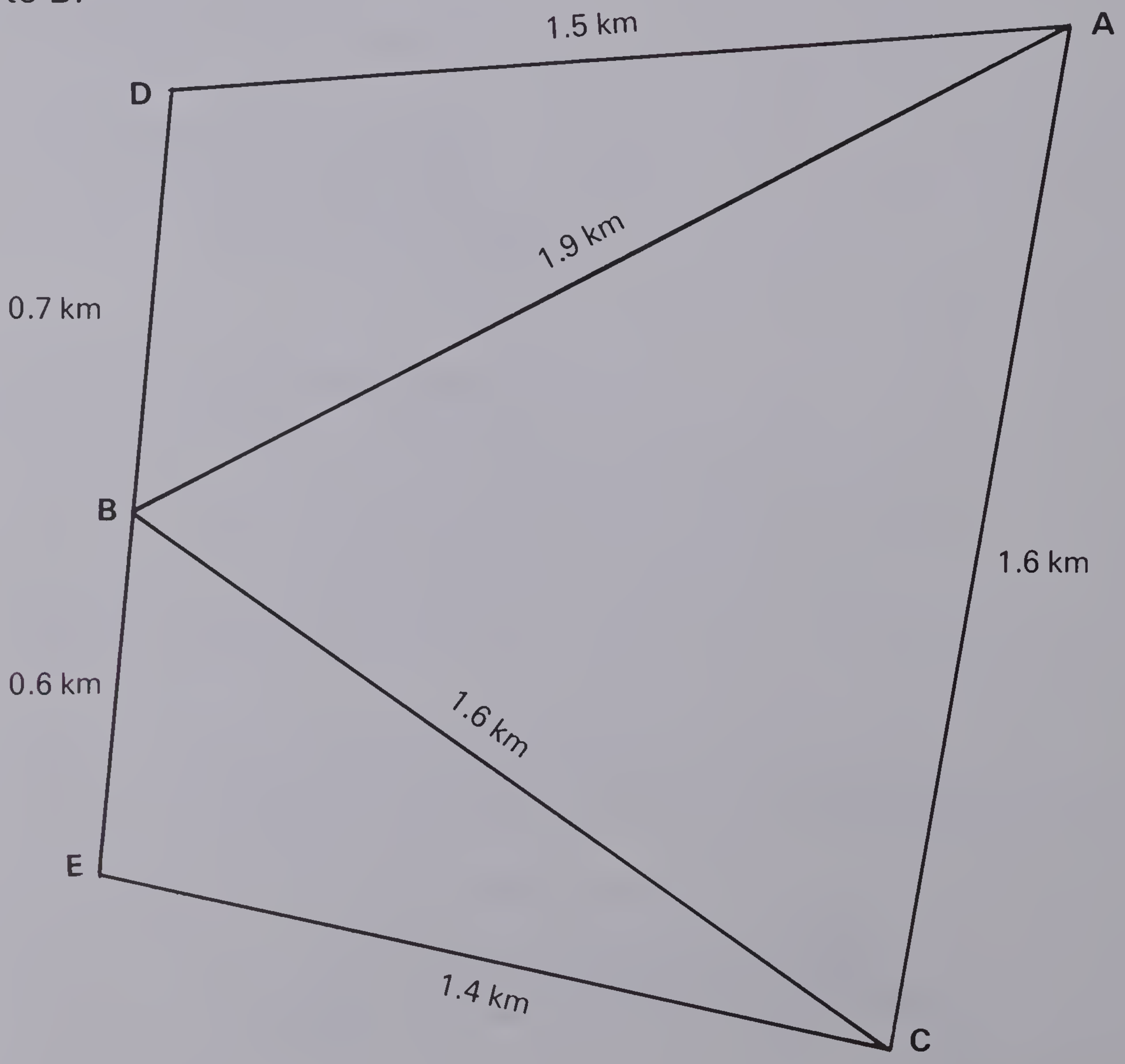
IN ACTION

1. This is an illustration of a jogging course.

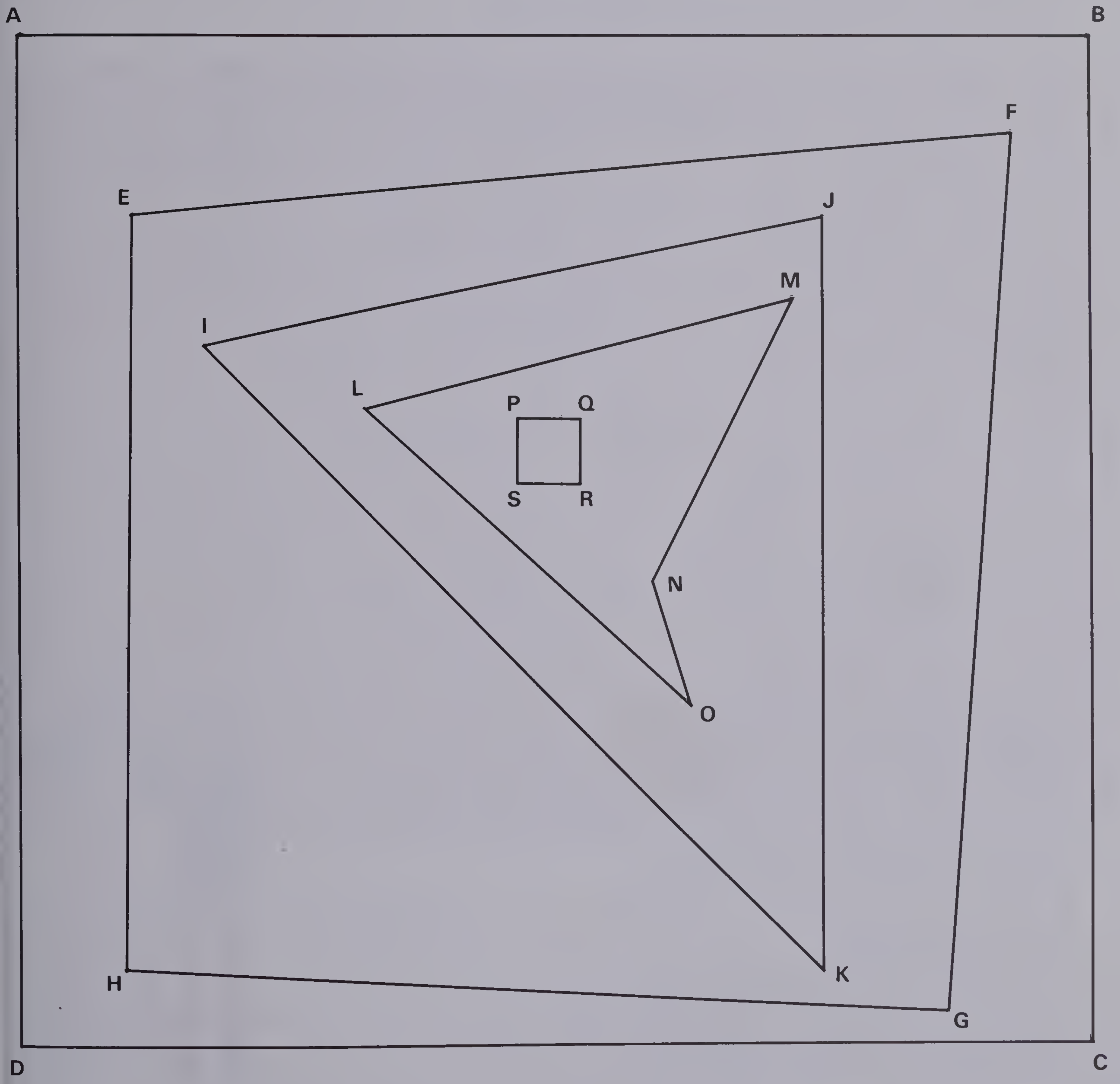
a) Colin jogged from point A to B to C and back to A. Trace the route he jogged and calculate the distance around it.

b) Trace the route and find the distance Sean jogged if he travelled from point A to D to E to C and back to A.

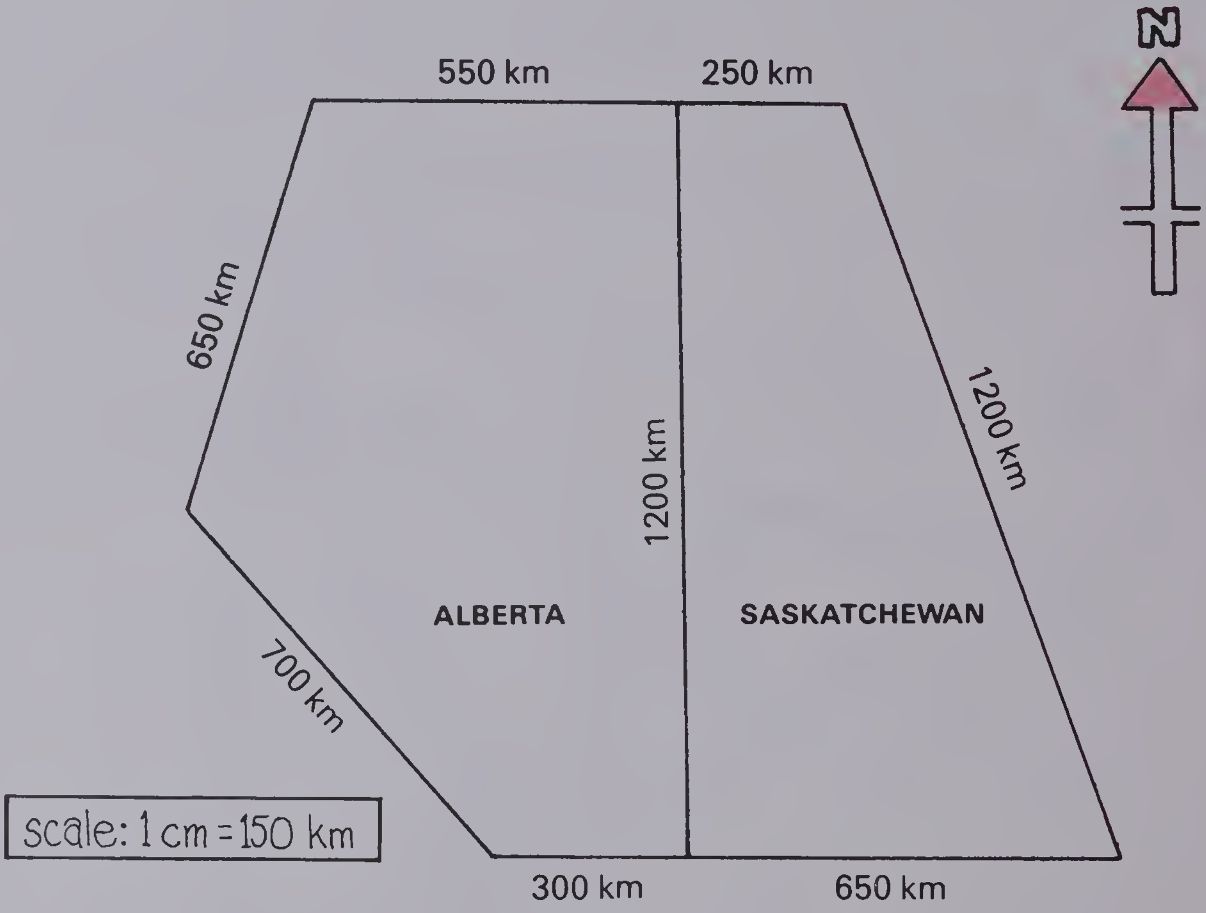
c) Trace the route and find the distance if the boys jogged from point B to E to C and back to B.

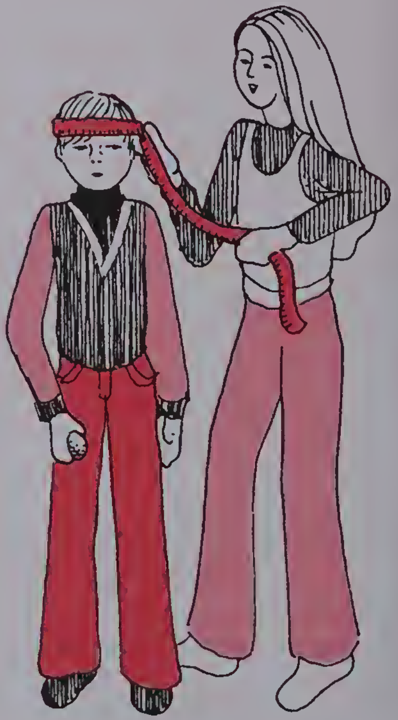

1.5 km
A
D
1.9 km
0.7 km
B
1.6 km
0.6 km
1.6 km
E
1.4 km
C

2. Find the distance around each figure.
Express each perimeter in centimetres.


A
B
F
E
J
M
I
L
P
Q
S
R
N
O
K
H
G
D
C

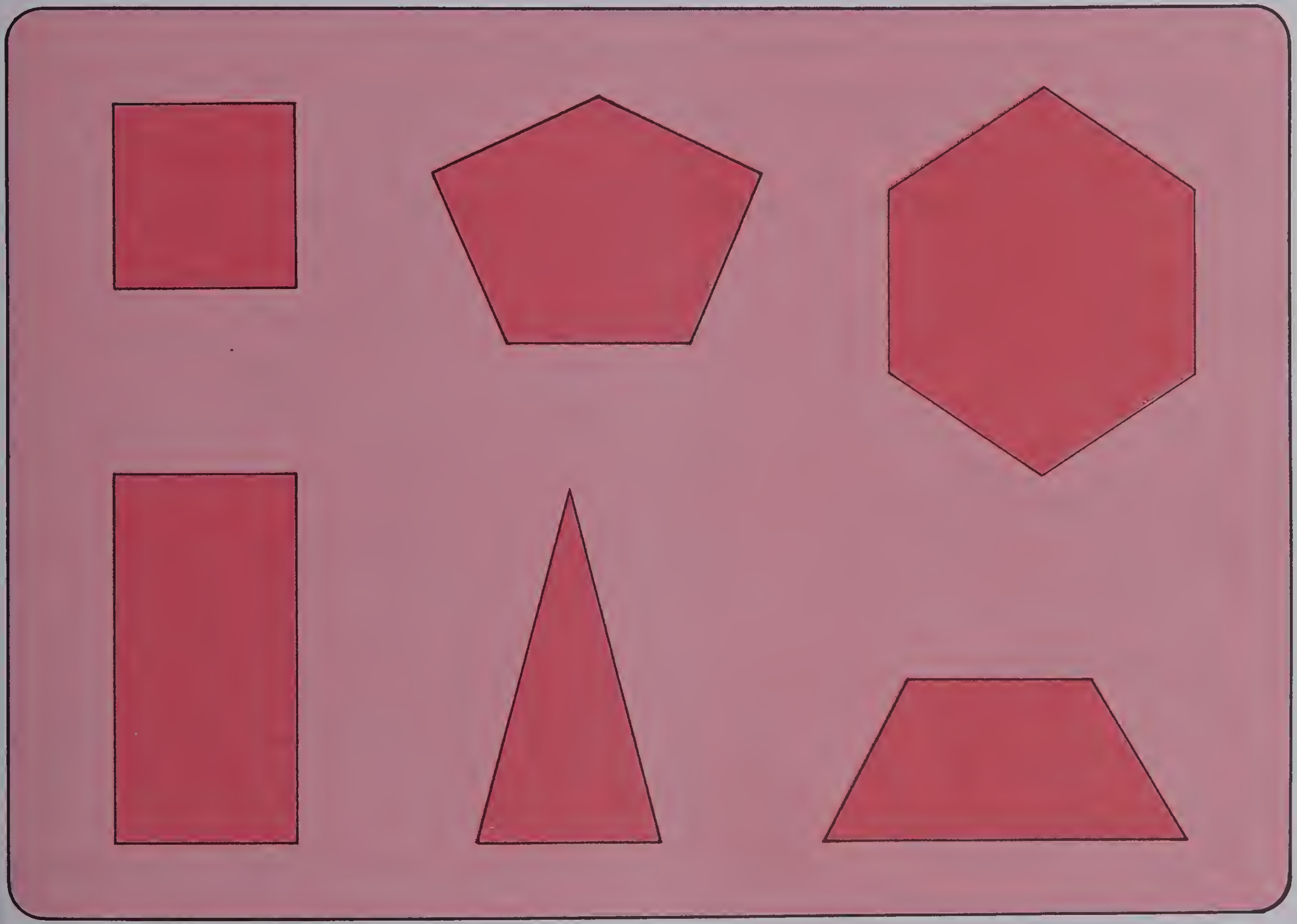
3. a) About what is the distance around Saskatchewan?
   b) About what is the distance around Alberta?
   c) What is the difference between the 2 perimeters?


N
550 km
250 km
650 km
1200 km
1200 km
ALBERTA
SASKATCHEWAN
700 km
scale: 1 cm = 150 km
300 km
650 km



4. Draw 3 different rectangles, each having a perimeter of 12 cm.
5. Draw a square and a rectangle, each having the same perimeter.
6. Draw a rectangle that has a perimeter the same length as the length of this page.
7. Find the perimeter of:
   a) your head to the nearest centimetre
   b) your index finger to the nearest millimetre
   c) your wrist to the nearest centimetre
   d) your waist to the nearest centimetre

8. By combining shapes, you can create new ones.
   Use tracing paper or cut out a set of shapes congruent to these.



Create shapes having these perimeters:

a) 20 cm
b) 17.5 cm
c) 25 cm
d) 22.5 cm
e) any length you choose

Unit 1, Check 1

Check your own progress. The answers are on page 92.

1. Use 4 of the digits 0, 1, 2, 5, 7, 9 for each number.
   a) Make 2 numbers so that the difference between them is 201.
   How many pairs can you make?
   b) Make the greatest number.
   c) Make the least number.
   d) Find the difference between the greatest number and the least number.

2. Find the total amount.

a) $\begin{array}{r} \$\ 4.89 \\ 1.50 \\ \underline{3.75} \end{array}$ b) $\begin{array}{r} \$\ 6.98 \\ 1.29 \\ \underline{5.25} \end{array}$ c) $\begin{array}{r} \$\ 7.39 \\ 6.54 \\ \underline{12.95} \end{array}$ d) $\begin{array}{r} \$29.50 \\ 31.89 \\ \underline{75.69} \end{array}$

3. Find the difference in amount.

a) $\begin{array}{r} \$\ 1.98 \\ \underline{0.99} \end{array}$ b) $\begin{array}{r} \$\ 7.75 \\ \underline{3.85} \end{array}$ c) $\begin{array}{r} \$12.43 \\ \underline{9.64} \end{array}$ d) $\begin{array}{r} \$19.23 \\ \underline{8.75} \end{array}$

4. Illustrate each fraction.

a) $\frac{3}{4}$ b) $\frac{7}{10}$ c) $\frac{4}{5}$ d) $\frac{3}{2}$ e) $\frac{7}{4}$ f) $\frac{6}{5}$

5. Write the equivalent fraction.

a) 0.3 b) 0.5 c) 0.9 d) 0.04 e) 0.67 f) 0.99

6. Write the equivalent decimal.

a) $\frac{9}{10}$ b) $\frac{1}{2}$ c) $\frac{3}{10}$ d) $\frac{34}{100}$ e) $\frac{75}{100}$ f) $\frac{11}{100}$

7. Complete.

a) $\frac{1}{2} = \frac{5}{?} = 0.? = \frac{?}{100}$ b) $\frac{4}{5} = \frac{?}{10} = \frac{?}{100} = 0.?$ c) $\frac{1}{4} = \frac{?}{100} = 0.?$

Practice 1

1. Write the numeral.

a) 400 + 27 + 0.3 + 0.04

b) 8000 + 700 + 60 + 9 + 0.07

c) 9000 + 38 + 0.06

d) 500 + 20 + 8 + 0.1 + 0.01

2. Add.

a) 4.65
3.87
9.28

b) 16.04
9.06
5.17

c) 35.06
27.18
19.24

d) 76.14
29.37
7.48

e) 84.32
96.75
81.96

f) 43.51
62.83
91.74

g) 53.62
98.41
76.39

h) 74.36
82.15
24.49

i) 67.39
25.46
82.28

j) 94.31
67.48
45.67

3. Subtract.

a) 23.65
18.49

b) 46.38
28.56

c) 57.46
23.68

d) 61.57
43.69

e) 75.41
56.82

f) 81.12
74.33

g) 56.40
18.52

h) 70.14
23.06

i) 83.06
65.07

j) 99.40
19.86

4. Write the equivalent fraction.

a) 0.4 b) 0.01 c) 0.2 d) 0.11 e) 0.75 f) 0.05 g) 0.25

5. Write the equivalent decimal.

a) $\frac{7}{10}$ b) $\frac{4}{10}$ c) $\frac{25}{100}$ d) $\frac{65}{100}$ e) $\frac{1}{2}$ f) $\frac{85}{100}$ g) $\frac{95}{100}$

6. Order from greatest to least.

a)

$\frac{75}{100}$ 0.6 0.85 0.9

0.09 $\frac{3}{10}$ 0.59 $\frac{6}{10}$

b)

$\frac{1}{2}$ $\frac{1}{4}$ 0.75 $\frac{4}{10}$

$\frac{49}{100}$ 0.6 $\frac{7}{10}$

Unit 1, Check 2

Check your progress with the answers on page 92.

1. Sove.

   a) $k + 8 = 17$ b) $p - 9 = 6$ c) $m - 4 = 7$ d) $n + 3 = 12$ e) $y - 9 = 0$

2. Solve.

   a) $7 \times p = 42$ b) $8 \times m = 80$ c) $9 \times n = 63$ d) $5 \times y = 45$ e) $6 \times k = 48$

3. Solve.

   a) $72 \div m = 9$ b) $k \div 6 = 5$ c) $y \div 3 = 8$ d) $63 \div n = 7$ e) $64 \div p = 8$

4. If *n* represents a number, how do you represent:

   a) 2 times the number b) 4 more than the number
   c) 3 less than the number d) the number divided by 5?

5. It is easy to multiply by 10 or 100 or 1000. Find the products.

   a) 7×10 b) 13×10 c) 1.4×10 d) 0.3×10 e) 0.45×10
   f) 6×100 g) 11×100 h) 2.9×100 i) 0.4×100 j) 0.16×100
   k) 2×1000 l) 27×1000 m) 1.2×1000 n) 0.5×1000 o) 0.21×1000

6. It is easy to divide by 10 or 100 or 1000. Find the quotients.

   a) $40 \div 10$ b) $175 \div 10$ c) $8 \div 10$ d) $0.9 \div 10$ e) $1.2 \div 10$
   f) $300 \div 100$ g) $150 \div 100$ h) $275 \div 100$ i) $1000 \div 100$ j) $85 \div 100$
   k) $8000 \div 1000$ l) $900 \div 1000$ m) $70 \div 1000$ n) $640 \div 1000$ o) $110 \div 1000$

7. Multiplying multiples of 10 can be done quickly. Find the products.

   a) 70×40
   $= 7 \times 10 \times 4 \times 10$
   $= 7 \times 4 \times 10 \times 10$
   $= 28 \times 100$
   $= 2800$

   b) 60×30 c) 20×90 d) 40×70
   e) 30×40 f) 40×50 g) 60×80
   h) 70×80 i) 80×80 j) 80×90

8. Find the products.

   a) 628×6 b) 62.8×6 c) 6.28×6 d) 84.3×5 e) 9.57×8
   f) 73.5×7 g) 89.4×8 h) 97.3×4 i) 68.7×9 j) 37.9×7

Practice 2

1. Solve.

a) $p + 9 = 16$ b) $a - 7 = 5$ c) $n - 8 = 9$ d) $m + 4 = 11$ e) $y - 8 = 5$

2. Solve.

a) $8 \times k = 40$ b) $6 \times m = 42$ c) $7 \times p = 63$ d) $9 \times y = 72$ e) $4 \times c = 32$

3. Solve.

a) $56 \div n = 7$ b) $p \div 4 = 9$ c) $k \div 7 = 5$ d) $e \div 8 = 8$ e) $y \div 6 = 9$

4. If p represents a number, how do you represent:

a) 3 times the number b) 5 more than the number
c) 6 less than the number d) the number divided by 10?

5. Multiply.

a) (8, 10) b) (14, 10) c) (10, 0.9) d) (0.04, 10) e) (10, 0.6)
f) (4, 100) g) (100, 17) h) (4.8, 100) i) (6.13, 100) j) (100, 1.01)
k) (6, 1000) l) (23, 1000) m) (6.2, 1000) n) (1000, 4.07) o) (1000, 18.19)

6. Divide the first number by the second.

a) (50, 10) b) (238,10) c) (1.9, 10) d) (0.5, 10) e) (47.6, 10)
f) (600, 100) g) (250, 100) h) (6, 100) i) (2000, 100) j) (75, 100)
k) (5000, 1000) l) (300, 1000) m) (40, 1000) n) (30, 1000) o) (220, 1000)

7. Complete.

a) 50×40
$= 5 \times 10 \times 4 \times 10$
$= 5 \times 4 \times 10 \times 10$
$= ? \times ?$
$= ?$

b) 30×80
$= 3 \times 10 \times 8 \times 10$
$= ? \times ? \times ? \times ?$
$= ? \times ?$
$= ?$

c) 50×60
$= ? \times ? \times ? \times ?$
$= ? \times ? \times ? \times ?$
$= ? \times ?$
$= ?$

d) 20×90
$= ? \times ? \times ? \times ?$
$= ? \times ? \times ? \times ?$
$= ? \times ?$
$= ?$

8. Find the products.

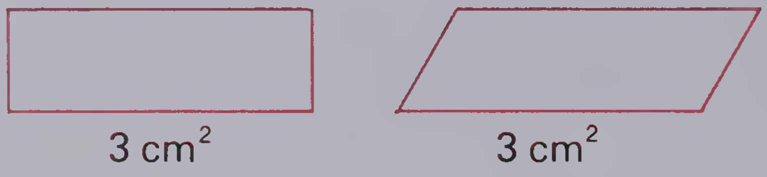
a) 47.3×6 b) 34.9×8 c) 65.2×9 d) 71.7×6 e) 98.7×5

Unit 1, Check 3

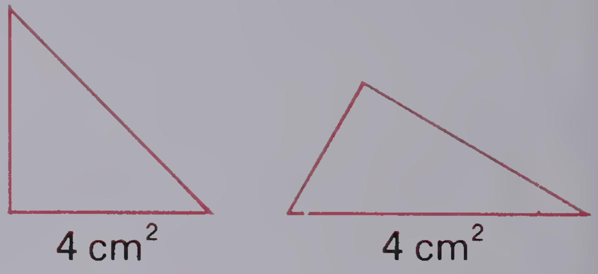
Check your progress with the answers on page 92.

1. Tell why the second figure is not congruent to the first.

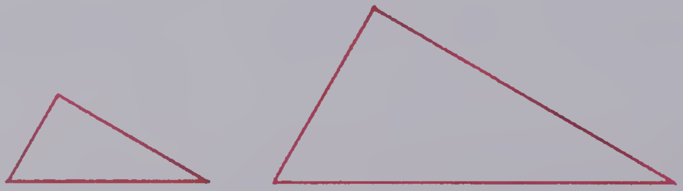
a)



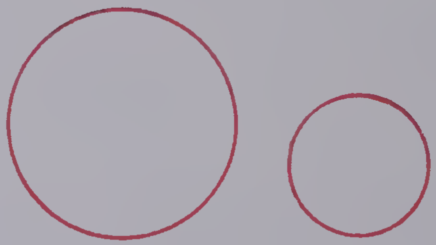
b)



c)

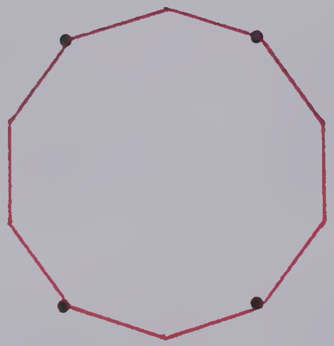


d)

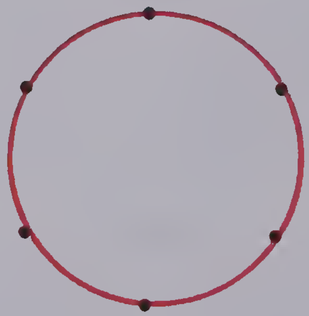


2. For each figure, trace the points shown. Join the points in order using a ruler. Name your new figure using capital letters. What kind of figure is it?

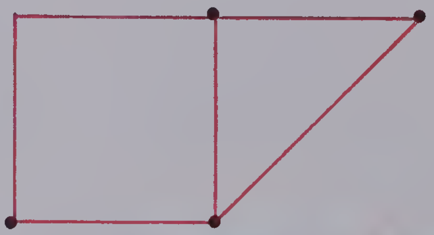
a)



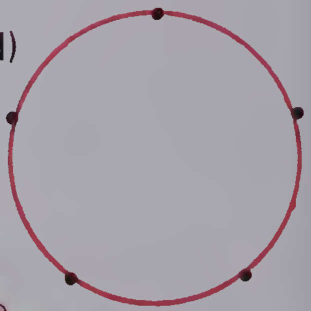
b)



c)



d)



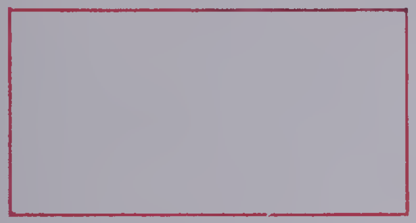
3. What unit of length would you use to measure:
   - a) the distance you could ride a bicycle in 15 min
   - b) the distance around a bicycle wheel
   - c) the length of a spoke
   - d) the thickness of a spoke?

4. What operation would you use to change:
   - a) a number of centimetres to a number of metres
   - b) a number of kilometres to a number of metres
   - c) a number of millimetres to a number of centimetres
   - d) a number of metres to a number of kilometres
   - e) a number of centimetres to a number of millimetres
   - f) a number of metres to a number of centimetres?

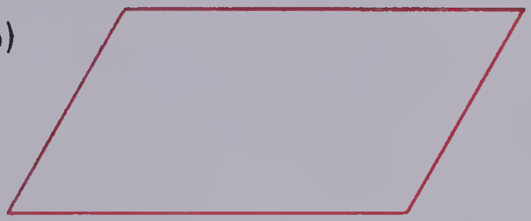
Practice 3

1. For each figure, draw a line segment to make 2 congruent parts. Can you do this in more than 1 way?

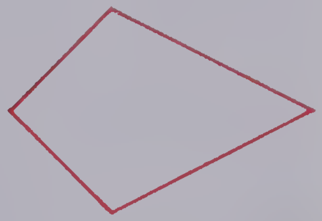
a)



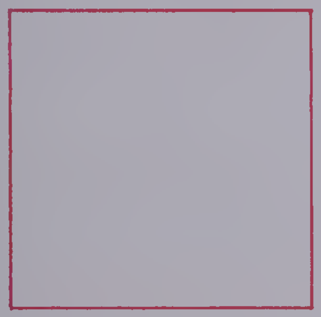
b)



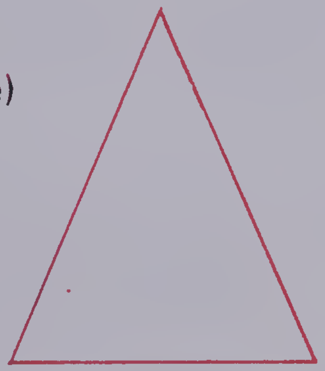
c)



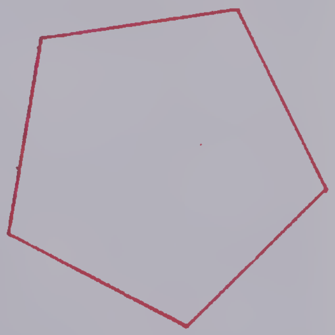
d)



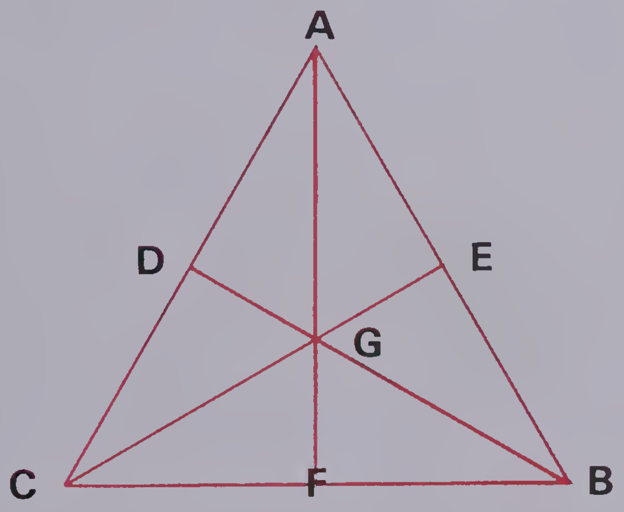
e)



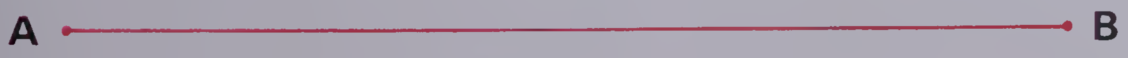
f)



2. Name some congruent parts.



3.



a) AB is 10 cm long. Express the measurement in millimetres, in metres.
b) A bookcase is 1.5 m tall. Express its height in centimetres.
c) The distance around the block is 0.4 km. Express the distance in metres.
d) A nail is 75 mm long. Express the length in centimetres.

Answers to Unit 1, Check 1

1. a) 9702, 9501; 5902, 5701. 2 pairs b) 975 210 c) 012 579 d) 962 631
2. a) \$10.14 b) \$13.52 c) \$26.88 d) \$137.08
3. a) \$0.99 b) \$3.90 c) \$2.79 d) \$10.48
4. Answers will vary.
5. a) $\frac{3}{10}$ b) $\frac{5}{10}$ or $\frac{1}{2}$ c) $\frac{9}{10}$ d) $\frac{4}{100}$ e) $\frac{67}{100}$ f) $\frac{99}{100}$
6. a) 0.9 b) 0.5 c) 0.3 d) 0.34 e) 0.75 f) 0.11
7. a) $\frac{1}{2} = \frac{5}{10} = 0.5 = \frac{50}{100}$ b) $\frac{4}{5} = \frac{8}{10} = \frac{80}{100} = 0.8$ c) $\frac{1}{4} = \frac{25}{100} = 0.25$

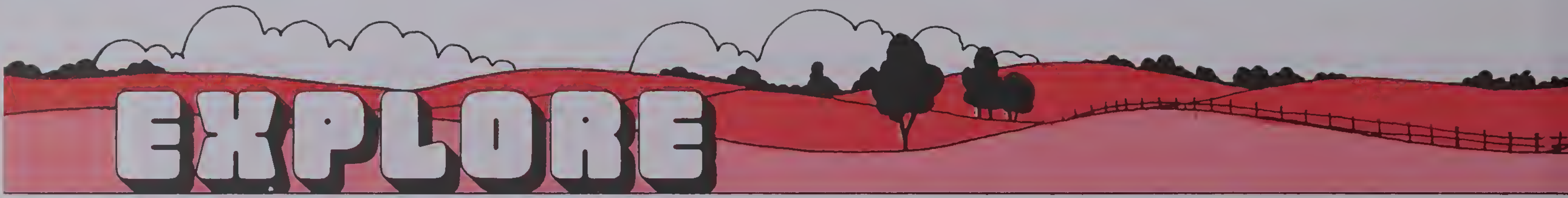
Answers to Unit 1, Check 2

1. a) $k = 9$ b) $p = 15$ c) $m = 11$ d) $n = 9$ e) $y = 9$
2. a) $p = 6$ b) $m = 10$ c) $n = 7$ d) $y = 9$ e) $k = 8$
3. a) $m = 8$ b) $k = 30$ c) $y = 24$ d) $n = 9$ e) $p = 8$
4. a) $2 \times n$ b) $n + 4$ c) $n - 3$ d) $n \div 5$
5. a) 70 b) 130 c) 14 d) 3 e) 4.5
   f) 600 g) 1100 h) 290 i) 40 j) 16
   k) 2000 l) 27 000 m) 1200 n) 500 o) 210
6. a) 4 b) 17.5 c) 0.8 d) 0.09 e) 0.12
   f) 3 g) 1.5 h) 2.75 i) 10 j) 0.85
   k) 8 l) 0.9 m) 0.07 n) 0.64 o) 0.11
7. a) 2800 b) 1800 c) 1800 d) 2800 e) 1200
   f) 2000 g) 4800 h) 5600 i) 6400 j) 7200
8. a) 3768 b) 376.8 c) 37.68 d) 421.5 e) 76.56
   f) 514.5 g) 715.2 h) 389.2 i) 618.3 j) 265.3

Answers to Unit 1, Check 3

1. a) Not same shape b) Not same shape c) Not same size d) Not same size
2. a) rectangle b) hexagon c) parallelogram d) pentagon
3. a) km b) m c) cm d) mm
4. a) division (by 100) b) multiplication (by 1000) c) division (by 10)
   d) division (by 1000) e) multiplication (by 10) f) multiplication (by 100)

I.Leventhal



PLACE VALUE/Ten Thousands and Hundred Thousands

THE EVENING STAR
DOWNTOWN FIRE BLAZES
Fire breaks out in old deserted warehouse
More snow ahead
Royal visit planned.....
Subway plans approved early

The Evening Star
Paid circulation for the month of August

454 644

What different ways can we use
to explain this number?

454 644

(read as "four hundred and fifty-four thousand,
six hundred, and forty-four")

MEANING

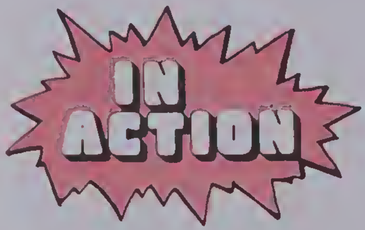
4 hundred thousands, 5 ten thousands, 4 thousands,
6 hundreds, 4 tens, and 4 ones

EXPANDED FORM

400 000 + 50 000 + 4000 + 600 + 40 + 4

PLACE VALUE CHART

100 000	10 000	1000	100	10	1
4	5	4	6	4	4



1. How would you read these numbers? Write your answers.
   a) 426 456 b) 159 249 c) 218 406 d) 629 260 e) 196 317
   f) 347 925 g) 204 116 h) 584 947 i) 461 207 j) 175 525
2. What is the expanded form?
   a) 211 416 b) 637 513 c) 462 424 d) 295 179 e) 812 260
   f) 974 307 g) 246 529 h) 794 639 i) 260 414 j) 705 294

3. Use a place value chart to explain these numbers.
   a) 292 652 b) 369 149 c) 140 252 d) 948 537 e) 521 060
   f) 492 712 g) 526 141 h) 374 573 i) 216 400 j) 255 715

4. Use the meaning form to explain these numbers.
   a) 411 213 b) 573 642 c) 402 070 d) 517 852 e) 311 614
   f) 200 115 g) 521 060 h) 492 717 i) 201 644 j) 255 715

5. Write the standard numeral.
   a) 200 000 + 70 000 + 3000 + 600 + 10 + 0
   b) 900 000 + 50 000 + 2000 + 800 + 90 + 0
   c) 300 000 + 0 + 5000 + 600 + 40 + 6
   d) 100 000 + 90 000 + 2000 + 400 + 10 + 4
   e) 400 000 + 60 000 + 1000 + 200 + 50 + 0

6. Write the standard numeral.

a)

100 000	10 000	1000	100	10	1
1	4	3	6	2	1

b)

100 000	10 000	1000	100	10	1
7	4	1	5	1	2

c)

100 000	10 000	1000	100	10	1
2	4	3	2	7	5

d)

100 000	10 000	1000	100	10	1
2	0	5	0	1	7

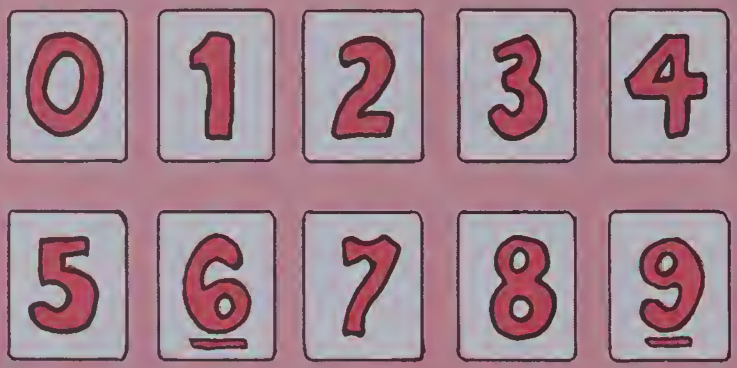
7. What is the value of each coloured digit?
   a) 747 **9**13 b) 5**2**5 236 c) 721 57**4** d) 36**6** 428
   e) **7**01 107 f) 978 1**4**2 g) 81**4** 693 h) 423 **9**72

8. What is the greatest number that can be represented by 6 digits with no digits repeated?

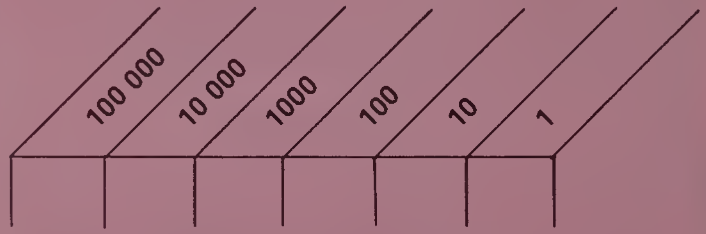
9. What is the least number that can be represented by 6 digits with no digits repeated?

Least Number (3 to 6 players)

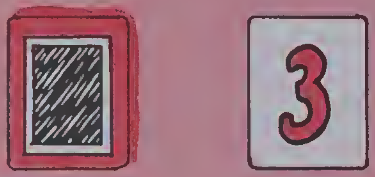
A Make a deck of cards like this.


0
1
2
3
4
5
6
7
8
9

B Each player makes a place value chart like this.

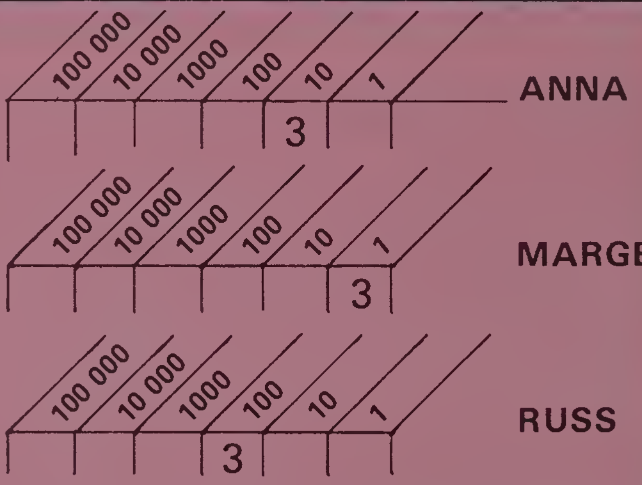

100 000
10 000
1000
100
10
1

C Shuffle the cards and place the deck face down.



The first player draws a card and places it face up beside the deck.

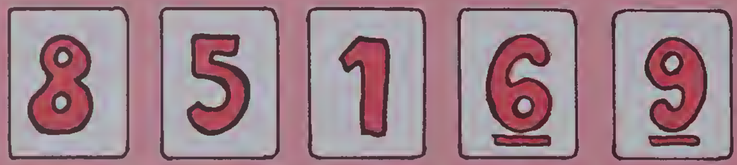
D


100 000
10 000
1000
100
10
1
3
ANNA
100 000
10 000
1000
100
10
1
3
MARGE
100 000
10 000
1000
100
10
1
3
RUSS

Write the numerals in your chart. These players wrote the 3 in the positions shown.

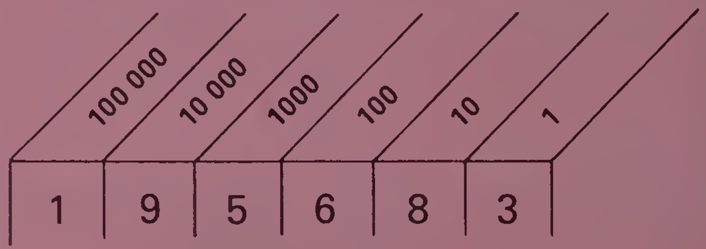
E Anna put the 3 in the tens place,
Marge in the ones place,
and Russ in the hundreds place.

The next 5 cards drawn were



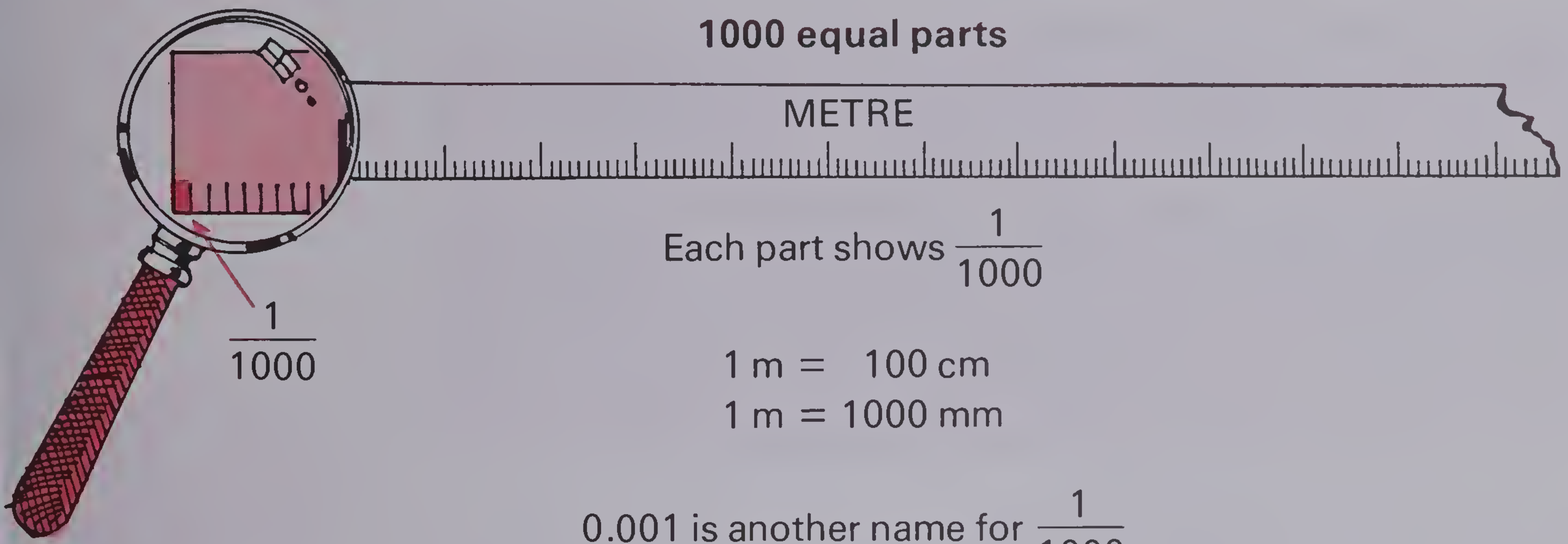
in that order.

F Marge put the numerals in these places.


100 000
10 000
1000
100
10
1
1
9
5
6
8
3

Could Anna or Russ have beaten her? Why?
Play this game yourself.

Thousandths



Each part shows $\frac{1}{1000}$

1 m = 100 cm
1 m = 1000 mm

0.001 is another name for $\frac{1}{1000}$

$\downarrow$ zero decimal zero zero one

$\downarrow$ one-thousandth

Let's use a place value chart to look at **thousandths.**

10	1	0.1	0.01	0.001
7	5	2	4	1

(read as "seventy-five decimal two four one")

EXPANDED FORM

70 + 5 + 0.2 + 0.04 + 0.001

IN ACTION

1. How would you read the following numbers? Write your answers.
   a) 46.357 b) 12.709 c) 59.463 d) 90.828 e) 87.036
2. Write the expanded form.
   a) 61.514 b) 28.175 c) 34.682 d) 73.990 e) 45.673

3. Write the value of the coloured digit.

a) 3**4**.756 b) 74.**5**63 c) **7**0.939 d) 91.20**7** e) 23.8**4**6

f) 35.**6**94 g) 5**2**.781 h) 89.2**0**8 i) 46.**1**51 j) 68.30**7**

4. How much less is the second number than the first?

a) 42.295; 41.295 b) 40.380; 40.280 c) 89.632; 89.622

d) 75.874; 65.874 e) 18.569; 18.568 f) 63.193; 62.193

g) 54.040; 54.030 h) 20.934; 20.933 i) 42.752; 42.652

5. Write the standard numeral for each of the following.

a) seventy decimal three eight six
b) sixty-five decimal seven four three
c) fifteen decimal one six four
d) thirty-six decimal five four seven
e) eighty decimal two nine eight

6. Increase each digit by 1.
How much greater is the new number than the given number?

a) 9.56 b) 28.81 c) 37.458 d) 58.783 e) 85.439

7. Decrease each digit by 1.
How much greater is the given number than the new number?

a) 7.38 b) 19.45 c) 36.249 d) 51.167 e) 90.034

8. Move the decimal point one place to the right and add 100.
What is the new number?

a) 54.45 b) 9.165 c) 16.147 d) 500.10 e) 10.311

9. Move the decimal point one place to the left and add 10.
What is the new number?

a) 8.44 b) 72.63 c) 99.99 d) 416.09 e) 0.76

10. What is the number?

a) Start with 0.9, add 0.1, move the decimal point 2 places to the right, then divide by 100.
b) Start with 0.99, add 0.01, move the decimal point 2 places to the left, then multiply by 100.

ADDITION AND SUBTRACTION/Decimals

ADDITION

24.35 ↑
16.79
41.14

Think	Record
14	4
8, ?	1
?, 11	1
2, 4	4

SUBTRACTION

41.14 ↓
16.79
24.35

Think	Record
14, 5	5
?, 3	3
10, ?	4
3, 2	2

IN ACTION

1. Add. (Remember to line up the decimal points.)

a)	b)	c)	d)	e)
36.42	5206	831.9	4 580	94.75
27.31	1954	12.8	7 063	68.97

2. Subtract.

a)	b)	c)	d)	e)
73.09	6080	356.2	7234	94.05
58.26	2671	95.4	1893	49.81

3. Find the total amounts.

a)	b)	c)	d)	e)
$52.34	$36.52	$27.63	$61.42	$83.05
17.67	48.90	9.58	53.49	16.79

f)	g)	h)	i)	j)
$ 7.21	$ 7.61	$ 3.93	$ 6.51	$ 1.50
3.52	3.42	7.73	7.61	0.94
8.13	4.44	4.22	8.04	3.48

4. Find the difference in amount.

a)	b)	c)	d)	e)
$53.24	$41.52	$19.18	$24.35	$30.23
14.32	22.53	0.49	21.68	19.44

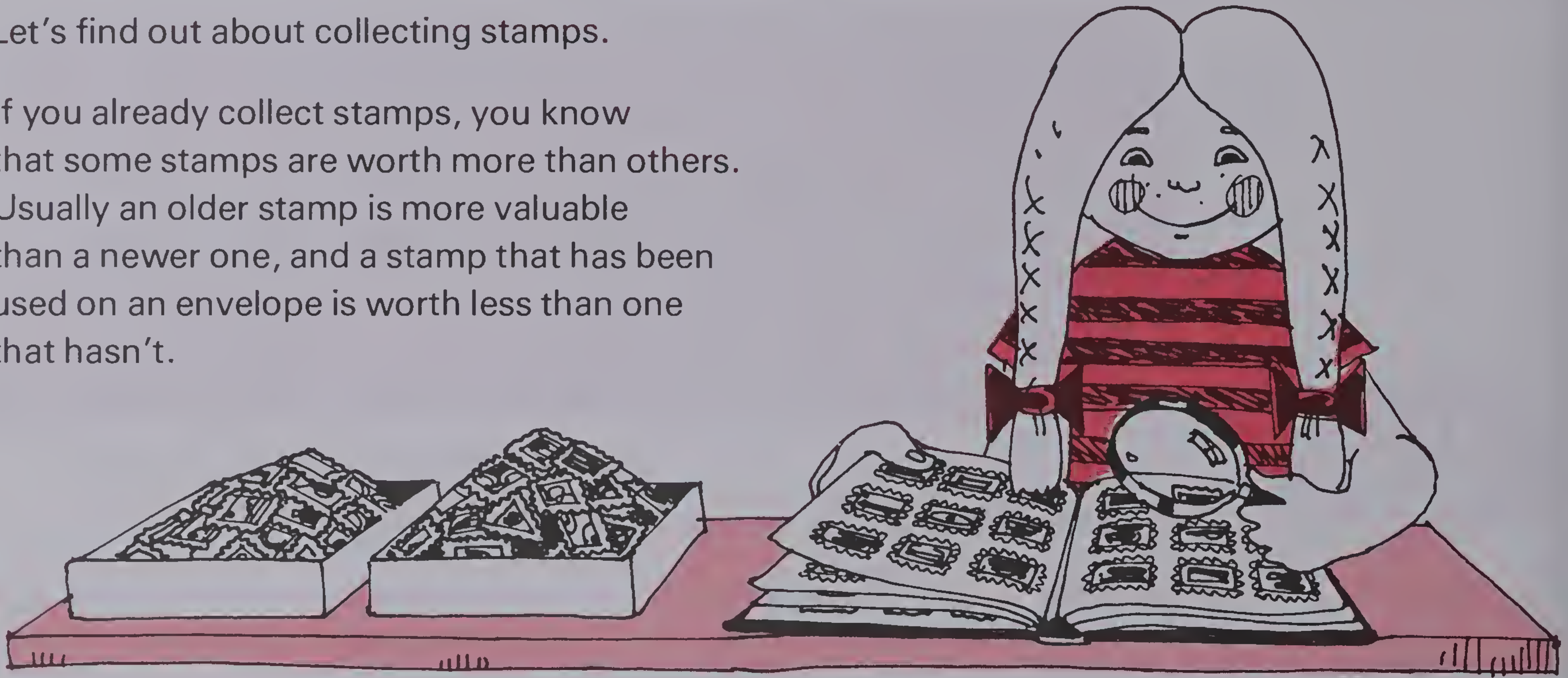
5. Add. Find the difference between the totals.

a)		b)		c)	
9 256	473	$46.20	$19.79	7 145	384
973	5 601	5.36	20.46	894	6254
1 032	4 320	13.84	8.09	2 021	986

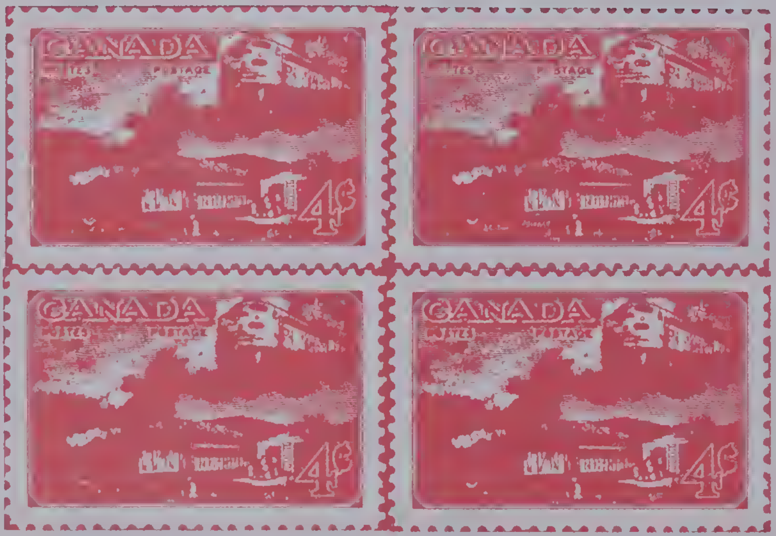
Stamp Collecting

Let's find out about collecting stamps.

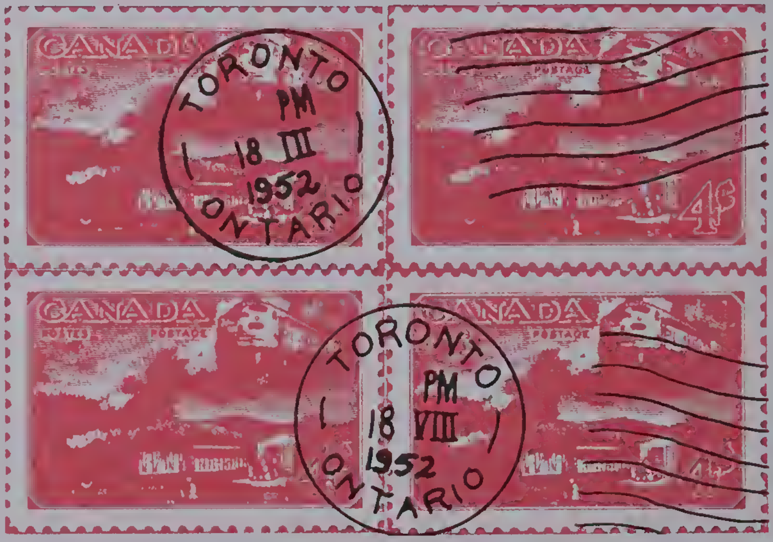
If you already collect stamps, you know that some stamps are worth more than others. Usually an older stamp is more valuable than a newer one, and a stamp that has been used on an envelope is worth less than one that hasn't.



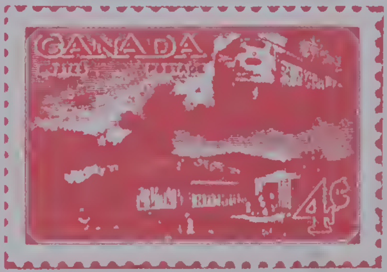
UNUSED BLOCK


CANADA
POSTES POSTAGE
4¢

USED BLOCK

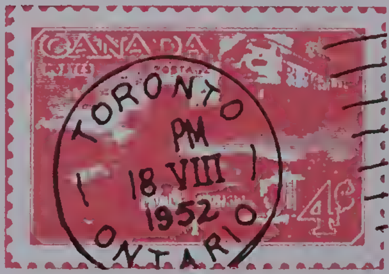

CANADA
POSTES POSTAGE
4¢
TORONTO
PM
18 III
1952
ONTARIO
TORONTO
PM
18 VIII
1952
ONTARIO

The face value of this stamp is 4¢.


CANADA
POSTES POSTAGE
4¢

UNUSED SINGLE

USED SINGLE

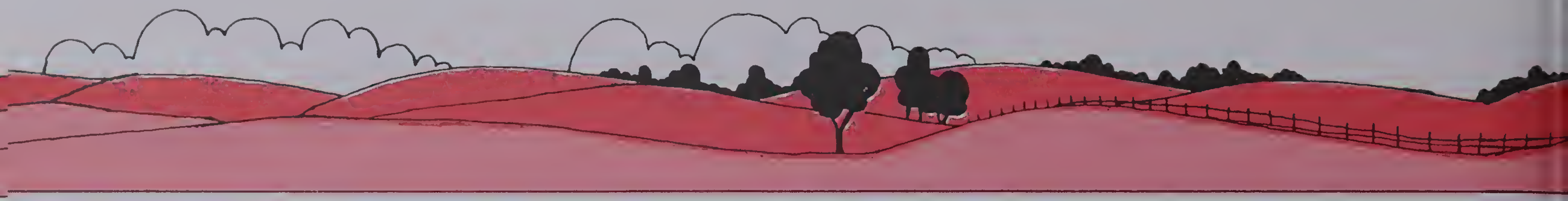

CANADA
POSTES POSTAGE
4¢
TORONTO
PM
18 VIII
1952
ONTARIO

Let's look at a page of a stamp catalogue and see what we can find.

		UNUSED		USED	
1950-1951	**RESOURCES**	**BLOCKS**	**SINGLES**	**BLOCKS**	**SINGLES**
301	10¢ Fur Trade	1.68	0.42	0.23	0.03
302	$1 Fish	55.00	13.75	14.00	3.30
1951 PRIME MINISTERS					
303	3¢ Borden	0.68	0.17	0.28	0.05
304	4¢ Mackenzie King	0.72	0.18	0.35	0.05

		UNUSED		USED	
1951 CENTENARY POSTAL ADMINISTRATION		**BLOCKS**	**SINGLES**	**BLOCKS**	**SINGLES**
305	4¢ Train	1.00	0.25	0.40	0.08
306	5¢ Steamship	4.60	1.15	3.75	0.85
307	7¢ Stagecoach	2.40	0.60	1.00	0.20
308	15¢ Beaver	2.40	0.60	0.85	0.18

		UNUSED		USED	
1951 ROYAL VISIT		**BLOCKS**	**SINGLES**	**BLOCKS**	**SINGLES**
309	4¢ Elizabeth and Philip	0.68	0.17	0.35	0.05
310	20¢ Lumbering	3.00	0.75	0.95	0.04
1952 RED CROSS					
311	4¢ Blue and Red	0.72	0.18	0.30	0.05



IN ACTION

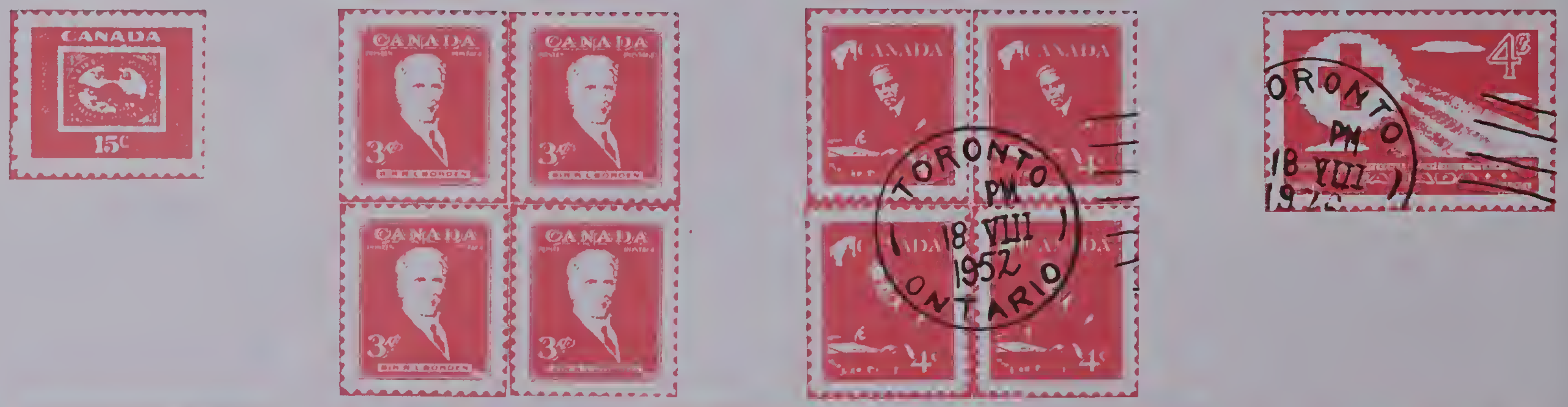
1. What is the total face value of the following?
   a) stamps 301 and 302
   b) stamps 303 and 304
   c) stamps 305 to 308
   d) a block of stamp 302
   e) a block of stamp 308
   f) a block of stamp 310

2. What is the total catalogue value of the following?
   a) 1 unused single of each of the stamps 301 and 302
   b) 1 unused block of each of the stamps 305 to 308
   c) 1 used single of each of the 4 Centenary Postal Administration stamps.
   d) 1 used block of each of the stamps 309 and 310

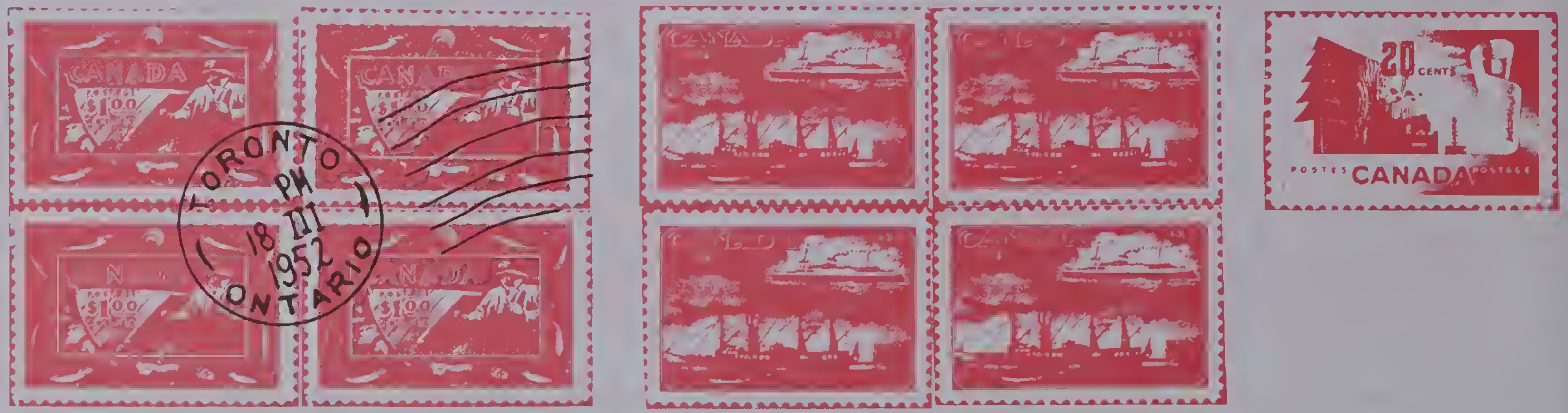
3. What is the difference between the face value and the catalogue price of an unused single?
   a) stamp 301
   b) stamp 302
   c) stamp 306
   d) stamp 310

4. What is the catalogue value?

a)


CANADA
15¢
CANADA
3¢
SIR R. L. BORDEN
CANADA
TORONTO
PM
18 VIII
1952
ONTARIO
4¢
4¢

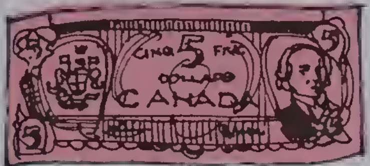
b)


CANADA
$1.00
TORONTO
PM
18 III
1952
ONTARIO
20 CENTS
POSTES CANADA POSTAGE

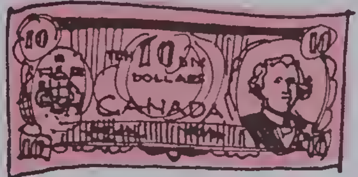
5. Maria collects Canadian unused blocks. She is missing stamps 302 and 306 from this page of the catalogue. What is the catalogue value of the stamps she has?

6. What is the difference between the face value and the catalogue value of an unused block?
   a) stamp 303 b) stamp 306 c) stamp 308 d) stamp 310

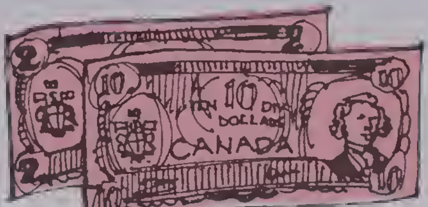
7. How much change?

a) 

Unused Singles
Stamps 305, 306, 307, 308

b) 

Used Blocks
Stamps 303, 304, 309, 310, 311

c) 

Unused Blocks
Stamps 305, 306, 307, 308

8.

SPEEDS		
1851 train - 30.5 km/h 1951 train - 136.5 km/h	1851 steamship - 7.9 km/h 1951 steamship - 46.8 km/h	1851 stagecoach - 9.7 km/h 1951 airplane - 930.2 km/h

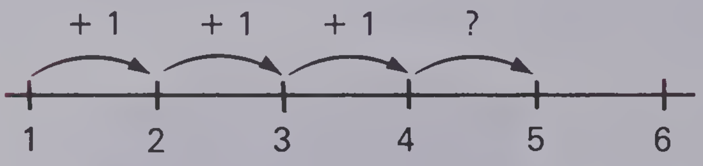
a) Which was the fastest way of delivering mail in 1851? Which was the slowest way?

b) How much faster was
   (i) the 1951 train than the 1851 train?
   (ii) the 1951 steamship than the 1851 steamship?
   (iii) the 1951 airplane than the 1851 stagecoach?

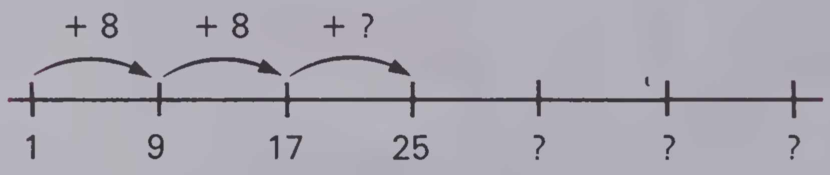
9. Research the speeds of today's trains, airplanes, and ocean liners.

Number Patterns

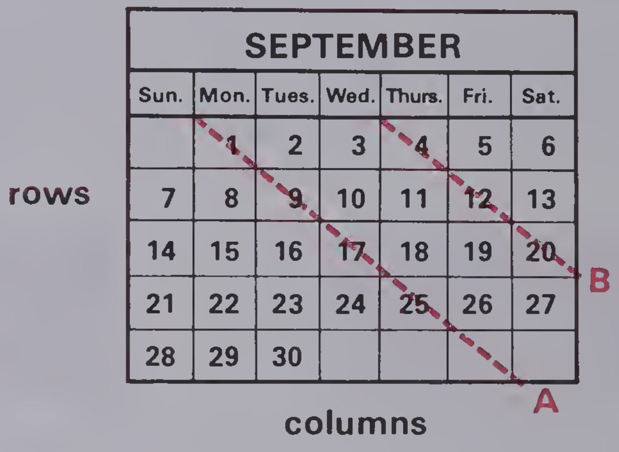
The number pattern for all rows is add 1.



What is the number pattern for all columns?
What is the number pattern for all rows when moving from right to left?
What is the number pattern for all columns when moving from bottom to top?
This is the number pattern for diagonal A.



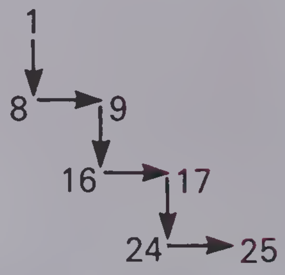
What are the next 3 numbers in this pattern?



SEPTEMBER						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

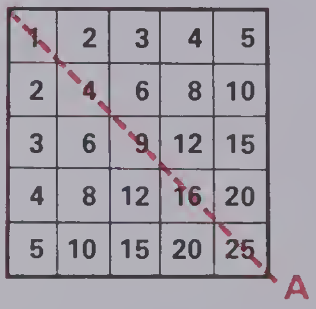
Compare diagonals A and B.
How are their patterns the same?
Is this true for all diagonals?

Look for a number pattern like this one.



Complete the pattern
1, 8, 9, 16, ? , ? , ?
How is this pattern formed?
Explain the pattern in terms of days and weeks.
Check a calendar.
Do these patterns fit any other month?
How many?

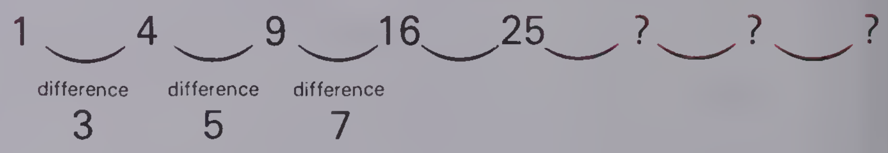
Look for other patterns.



1	2	3	4	5
2	4	6	8	10
3	6	9	12	15
4	8	12	16	20
5	10	15	20	25

What is the pattern for each row?
What is the pattern for each column?
Compare the patterns.

For the numbers on diagonal A, find a new pattern this way.

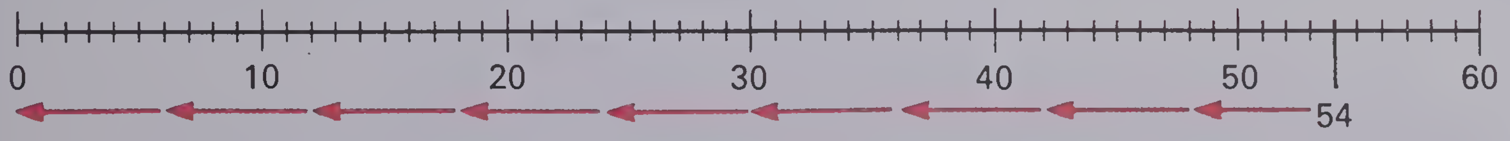


Continue the pattern.

Extend to an 8 by 8 chart.
What happens to the number patterns?

DIVISION/Meaning of Division

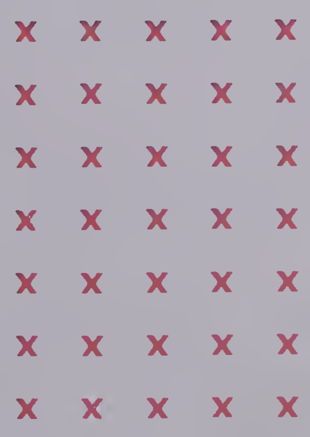
54 ÷ 6 means how many 6's in 54.

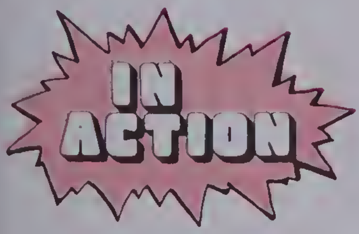


There are nine 6's in 54. The division sentence is

$\boxed{54 \div 6 = 9}$

An array shows division.
Find 35 ÷ 5.
There are 35 X's in the array.
There are 7 rows and, since there are 5 columns,
35 ÷ 5 = 7





1. Show the meaning of:
   a) 32 ÷ 4 b) 49 ÷ 7 c) 39 ÷ 3 d) 60 ÷ 5 e) 60 ÷ 6

2. Write the division sentence to express how many:
   a) 3's in 30 b) 4's in 24 c) 6's in 36 d) 5's in 45
   e) 7's in 56 f) 8's in 64 g) 7's in 70 h) 8's in 80
   i) 5's in 50 j) 7's in 63 k) 9's in 72 l) 10's in 100

A Method for Division

In the division sentence

$$\overset{}{54 \div \underset{\swarrow}{6} = \underset{\searrow}{9}}$$

6 is the divisor   9 is the quotient

For more difficult questions, we need to know a way to find the quotient.

Here is one way. Find 91 ÷ 7.

```
        7)91 |
          70 |  10
          21 |
          21 |   3
divisor      |  13
```

How many 7's are there in 91?
Since 7 × 10 = 70, there are at least 10.
How many 7's are there in 21?

91 ÷ 7 = 13

Find 257 ÷ 8.

```
8)257 |
  240 |  30
   17 |
   16 |   2
    1 |  32
```

How many 8's are there in 257?
Since 30 × 8 = 240, there are at least 30.
How many 8's are there in 17?

257 ÷ 8 is 32 remainder 1, or 32R1

IN ACTION

1. Divide.
   - a) 84 by 6
   - b) 94 by 5
   - c) 246 by 6
   - d) 375 by 5
   - e) 439 by 7
   - f) 821 by 4
   - g) 978 by 7
   - h) 673 by 9
   - i) 894 by 6
   - j) 989 by 9

Long Division

If you understand division, try this short cut for finding the quotient.
Divide 96 by 4.

$$\begin{array}{r} 24 \\ 4\overline{)96} \\ \underline{8} \\ 16 \\ \underline{16} \\ 0 \end{array}$$

$96 \div 4 = 24$

Think this way.
How many 4's are there in 9? — About 2
Write 2 above the 9.
$4 \times 2 = 8$ Write 8 below the 9.
Subtract. — 1
Bring down the 6 beside the 1.
How many 4's are there in 16? — 4
Write 4 above the 6.
$4 \times 4 = 16$ Write 16 below the 16.
Subtract. — 0

Divide 784 by 7.

$$\begin{array}{r} 112 \\ 7\overline{)784} \\ \underline{7} \\ 08 \\ \underline{7} \\ 14 \\ \underline{14} \\ 0 \end{array}$$

$784 \div 7 = 112$

How many 7's are there in 7? — 1
Write 1 above the 7.
$7 \times 1 = 7$ Write 7 below the 7.
Subtract. — 0
Bring down the 8 beside the 0.
How many 7's are there in 8? — About 1
Write 1 above the 8.
$7 \times 1 = 7$ Write 7 below the 8.
Subtract. — 1
Bring down the 4 beside the 1.
How many 7's are there in 14? — 2
Write 2 above the 4.
$7 \times 2 = 14$ Write 14 below the 14.
Subtract. — 0

IN ACTION

1. Complete.
   a) Divide 84 by 6.

```
  1?
6)84
  ?
  ??
  ??
   0
```

How many 6's are there in 8? — About ?
Write ? above the 8.
6 × ? = ? Write ? below the 8.
Subtract. — ?
Bring down the 4 beside the ?
How many 6's are there in ? — ?
Write ? above the 4.
6 × ? = ? Write ? below the ?
Subtract. — 0

   b) Divide 585 by 5.

```
  ???
5)585
  ?
  ??
   ?
   ??
   ??
    0
```

How many 5's are there in 5? — ?
Write ? above the 5.
5 × ? = ? Write ? below the 5.
Subtract. — ?
Bring down the ? beside the ?
How many 5's are there in ? — About ?
Write ? above the ?
5 × ? = ? Write ? below the ?
Subtract. — ?
Bring down the ? beside the ?
How many 5's are there in ? — ?
Write ? above the ?
5 × ? = ? Write ? below the ?
Subtract. — ?

2. Complete.

   a) 3)87 b) 4)60 c) 7)98 d) 8)96 e) 6)684

3. Divide.
   a) 912 by 8 b) 826 by 7 c) 999 by 9 d) 714 by 6 e) 625 by 5

Long Division / Remainders

Divide 867 by 7.

$$\begin{array}{r@{\,}r l}
 & 123 & \\
7\big) & \overline{864} & \\
 & \underline{7} & \\
 & 16 & \\
 & \underline{14} & \\
 & 24 & \\
 & \underline{21} & \\
 & 3 & \quad \text{Remainder}
\end{array}$$

864 ÷ 7 is 123 remainder 3, or 123R3

The first digit in the number may be less than the divisor.

$$\begin{array}{r@{\,}r}
 & 32 \\
8\big) & \overline{257} \\
 & \underline{24} \\
 & 17 \\
 & \underline{16} \\
 & 1
\end{array}$$

257 ÷ 8 = 32R1

Since 2 < 8, think:
How many 8's are there in 25? — About 3
Write 3 above the 5.
8 × 3 = 24
How many 8's are there in 17? — About 2
Write 2 above the 7.
8 × 2 = 16

IN ACTION

1. Complete.

a) $5\overline{)135}$ b) $4\overline{)155}$ c) $6\overline{)248}$ d) $8\overline{)347}$ e) $6\overline{)204}$

2. Find.

a) 179 ÷ 3 b) 457 ÷ 7 c) 426 ÷ 8 d) 553 ÷ 9 e) 374 ÷ 4

3. Divide.

a) 210 by 5 b) 349 by 6 c) 604 by 7 d) 600 by 8 e) 749 by 9

The Digit 0 in a Quotient

Divide 654 by 6.

```
    109
 6)654
   6
  [ 5
  [ 0
   54
   54
```

You don't need to record this step.

654 ÷ 6 = 109

How many 6's are there in 6? — 1
Write 1 above the 6.
6 × 1 = 6
Subtract. — 0
(It is not necessary to write the 0.)
Bring down the 5.
5 < 6 Write 0 above the 5.
6 × 0 = 0
Subtract. — 5
Bring down the 4 beside the 5.
How many 6's are there in 54? — 9
Write 9 above the 4.
6 × 9 = 54
Subtract. — 0

Divide 864 by 8.

```
    108
 8)864
   8
    64
    64
```

Remember to write 0 above the 6.

Check: 800 ÷ 8 = 100
The quotient 108 is probably correct.

IN ACTION

1. Divide.
   a) 354 by 3
   b) 428 by 4
   c) 535 by 5
   d) 606 by 6
   e) 708 by 7
   f) 739 by 4
   g) 628 by 6
   h) 785 by 7
   i) 937 by 9
   j) 867 by 8

Long Division with Decimals

Divide 25.6 by 8.

$$\begin{array}{r} 3.2 \\ 8\overline{)25.6} \\ \underline{24} \\ 16 \\ \underline{16} \end{array}$$

25.6 ÷ 8 = 3.2

25 ÷ 8 is about 3.
Write 3 above the 5.
Place a decimal point in the quotient
above the decimal point in the number.
16 ÷ 8 = 2

Check by multiplying.
3.2 × 8 = 25.6
Our short cut works for a decimal number.

IN ACTION

1. Divide. Check by multiplying.

a) $7\overline{)30.1}$ b) $6\overline{)33.6}$ c) $4\overline{)27.2}$ d) $5\overline{)36.5}$ e) $8\overline{)67.2}$
f) $9\overline{)55.8}$ g) $7\overline{)67.2}$ h) $6\overline{)53.4}$ i) $3\overline{)30.6}$ j) $5\overline{)42.5}$
k) $6\overline{)45.6}$ l) $9\overline{)78.3}$ m) $8\overline{)13.6}$ n) $4\overline{)35.6}$ o) $9\overline{)89.1}$

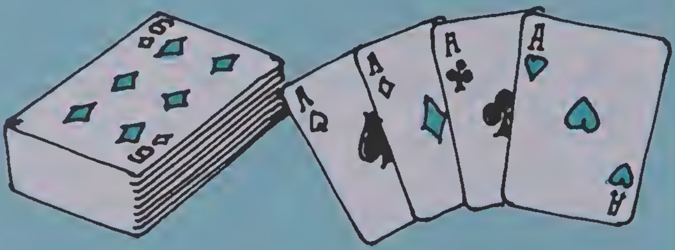
2. Find the length of one side of a square. The perimeter is 34.4 cm.

3. Find the length of one side of a regular pentagon (sides all same length). The perimeter is 39.5 cm.

4. A jogger covers 4 km in 23.2 min. How long does he take to jog 1 km?

5.

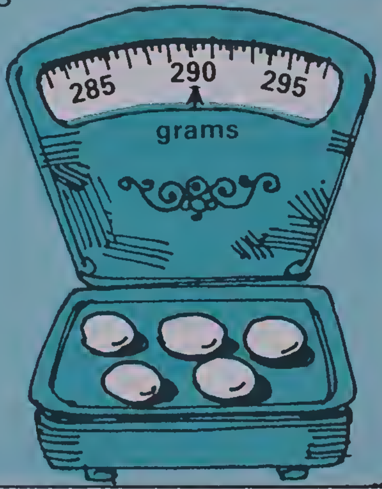
a) There are 52 cards in a deck. There are 4 suits – clubs, diamonds, hearts, and spades.



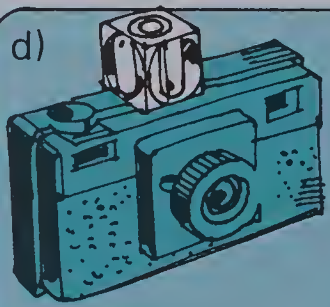
How many cards are there in each suit?

b) A volleyball tournament drew 63 competitors. A team was allowed 9 players. How many teams were there?

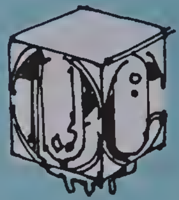
c) What is the mass of 1 egg?



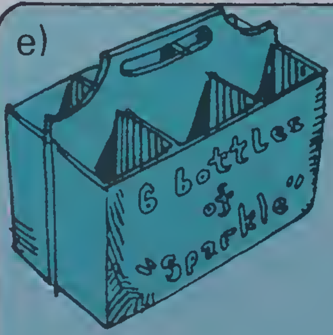
d) A flash cube gives 4 flashes.



How many flash cubes will you need for a film with 36 exposures?

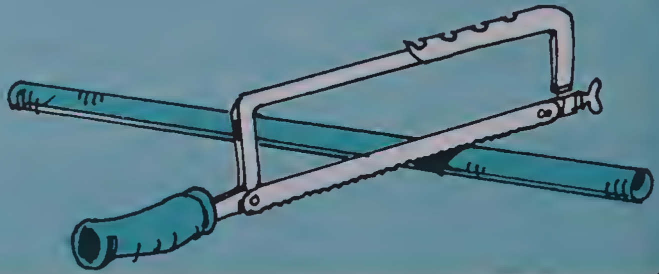


e) 6 bottles of "Sparkle"



How many full cartons will there be if there are 135 bottles?

f) Cut a dowel that is 58.1 cm long into 7 equal pieces. How long is each piece?



Retrace Your Steps

1. Write in expanded form the number of take-offs and landings for 1 year from these cities:

a) Atlanta	484 562	b) Toronto	241 735
c) Santa Ana	605 530	d) Montreal	192 958

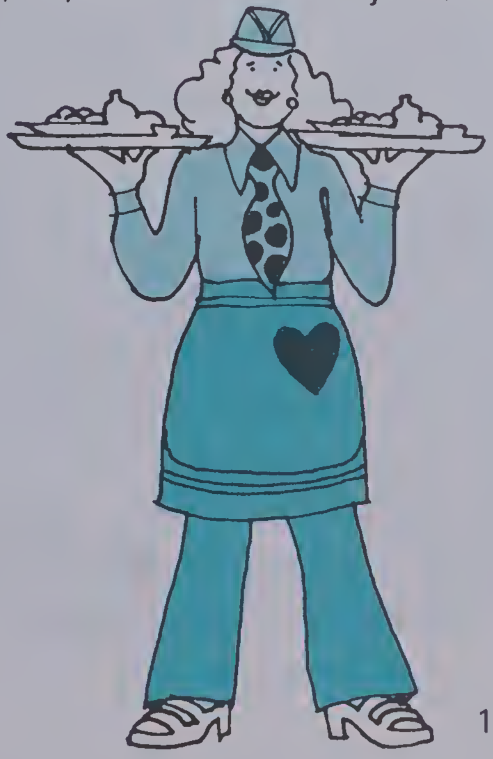
2. The world's record for balloon altitude is 34.668 km. Use the meaning form to explain this number.

3. Solve.
   a) $k = 175 \div 5$ b) $g = 152 \div 6$ c) $m = 324 \div 4$
   d) $a = 492 \div 6$ e) $p = 529 \div 7$ f) $n = 482 \div 4$
   g) $y = 981 \div 9$ h) $r = 884 \div 2$ i) $m = 999 \div 9$
   j) $w = 800 \div 5$ k) $c = 248 \div 8$ l) $d = 714 \div 7$

4. Divide. Check by multiplying.
   a) 342 by 3 b) 765 by 5 c) 584 by 4 d) 896 by 8 e) 245 by 7
   f) 409 by 6 g) 690 by 4 h) 396 by 3 i) 756 by 6 j) 927 by 5

5. Divide. Check by multiplying.
   a) $4\overline{)640}$ b) $5\overline{)368}$ c) $9\overline{)279}$ d) $3\overline{)418}$ e) $6\overline{)962}$
   f) $8\overline{)246}$ g) $4\overline{)691}$ h) $2\overline{)936}$ i) $5\overline{)685}$ j) $7\overline{)964}$

6. Find the number of flights at Ottawa International Airport. The number has an 8 in the tens and ten-thousands places, a 1 in the hundred and hundred-thousands places, a 3 in the thousands place, and a 6 in the ones place.



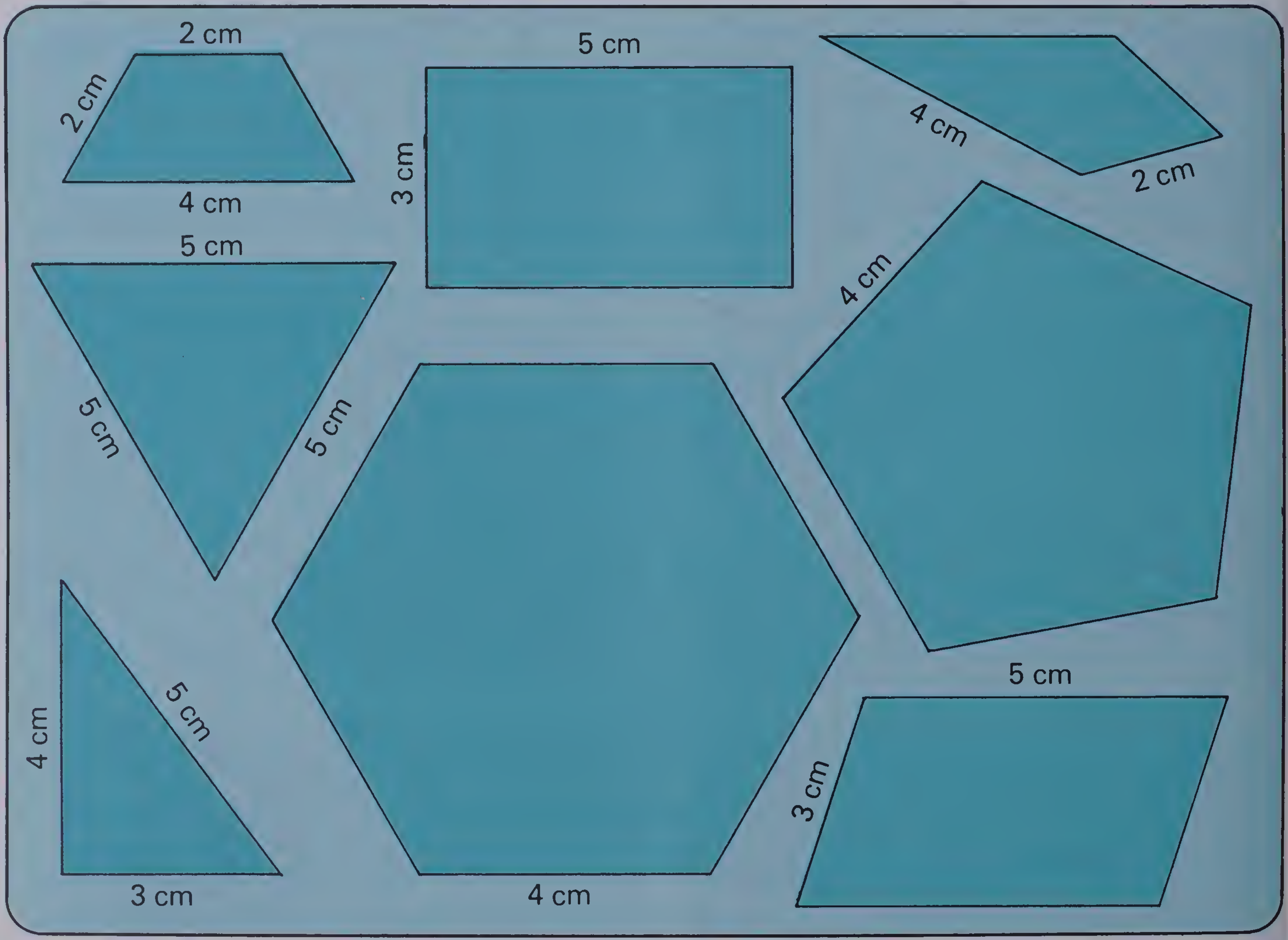
7. A sheet of 100 airmail stamps costs $20.00. What is the cost of 1 stamp?

8. A plane has 180 seats with 6 seats to a row. How many rows are there?

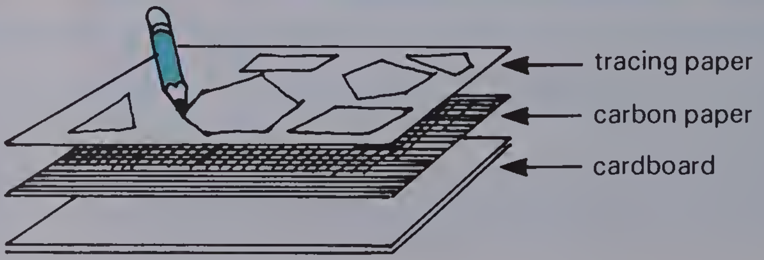
9. A stewardess takes 1 min (minute) to serve 4 meals. How long will it take to serve 80 meals?

Cardboard Shapes

Make your own set of cardboard shapes.
Keep them in an envelope.
They can be useful to you in your math activities.

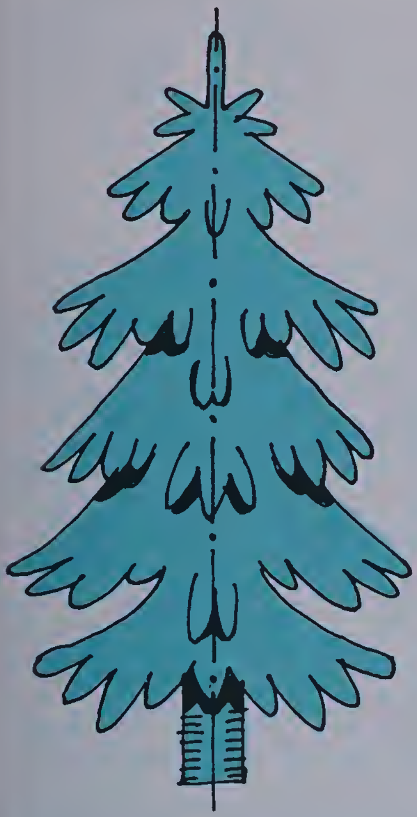

2 cm
2 cm
4 cm
5 cm
3 cm
4 cm
2 cm
5 cm
5 cm
5 cm
4 cm
4 cm
5 cm
3 cm
4 cm
5 cm
3 cm

1. Trace these shapes.
2. Place a piece of carbon paper between the tracing paper and the cardboard.
3. Draw over the shapes again.
4. Cut out the shapes.

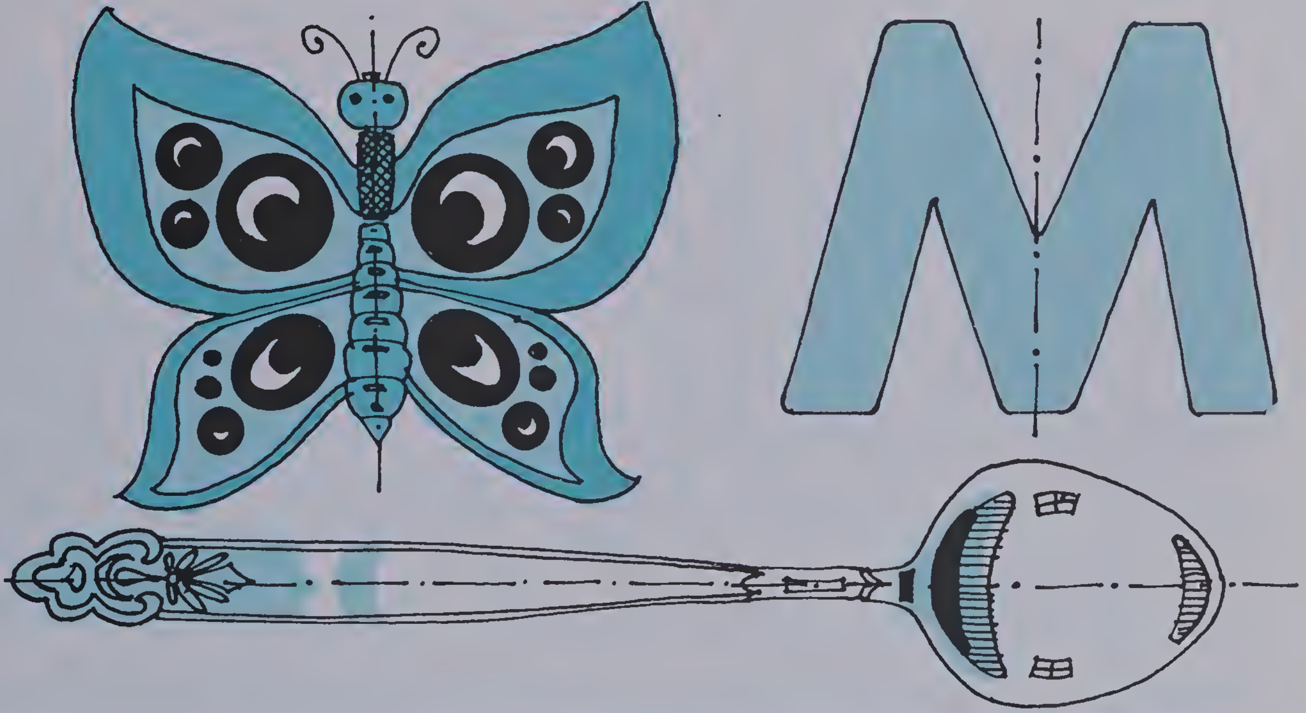

tracing paper
carbon paper
cardboard

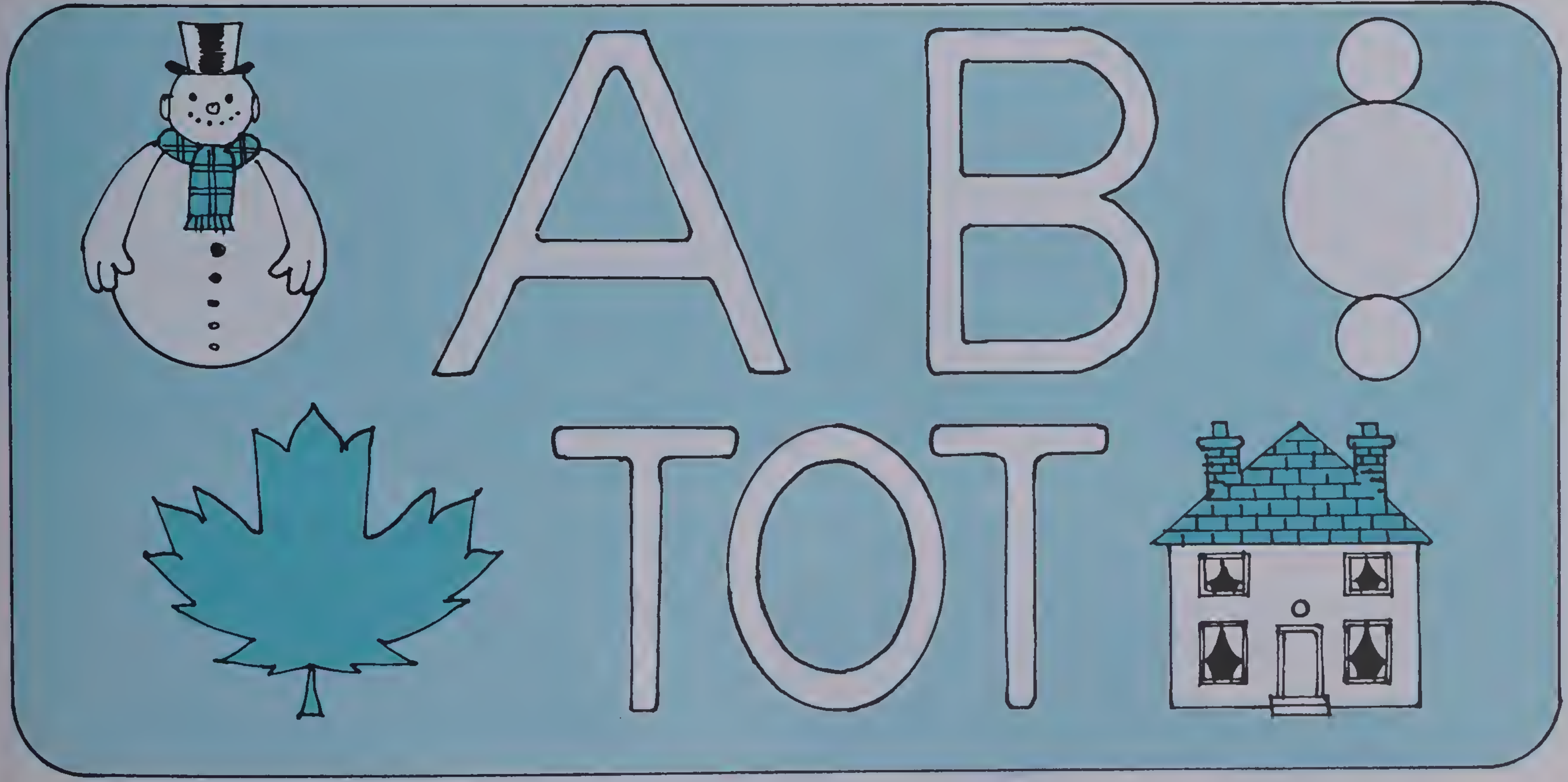
EXPLORE

SYMMETRY/ Lines of Symmetry



A **line of symmetry** divides an object so that one half is congruent to the other half.

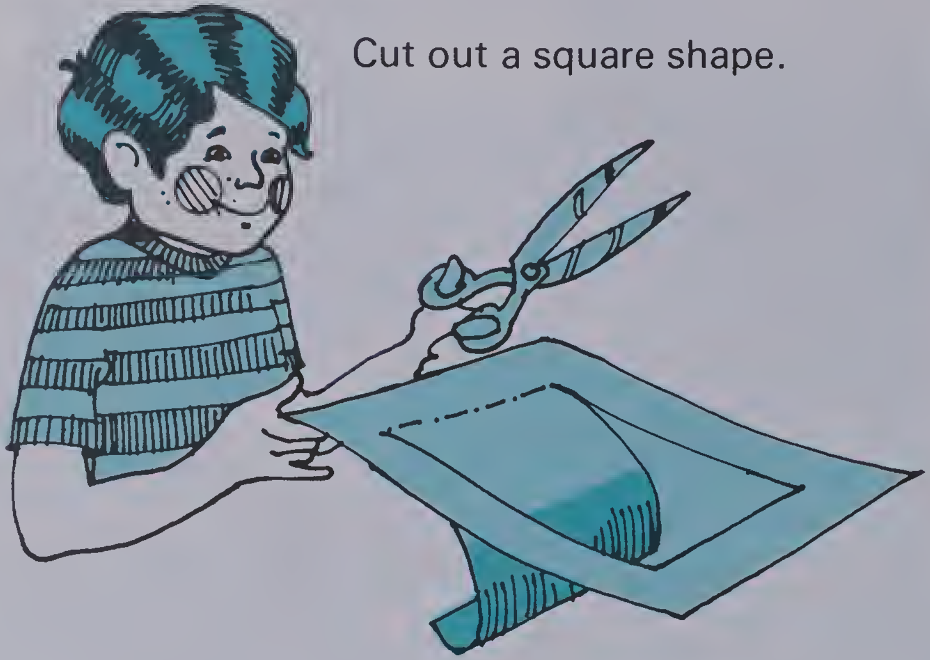


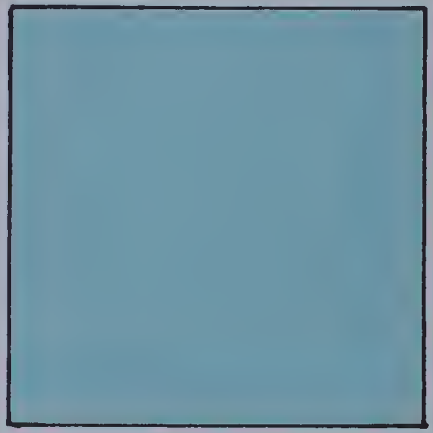


Trace these objects and draw the lines of symmetry.

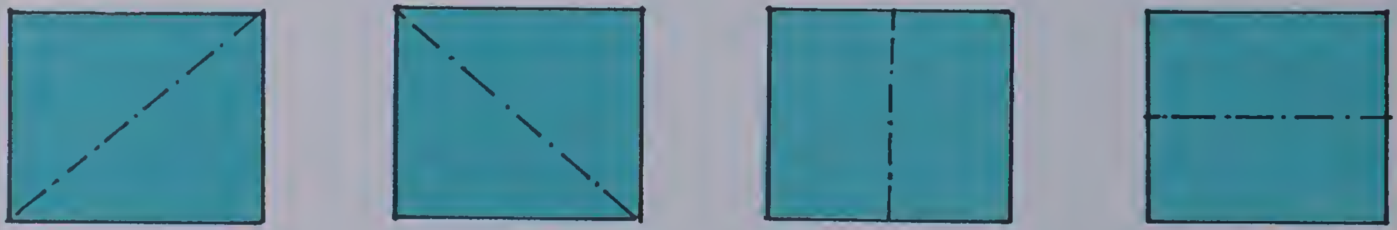
Sometimes shapes have more than 1 line of symmetry.

Cut out a square shape.



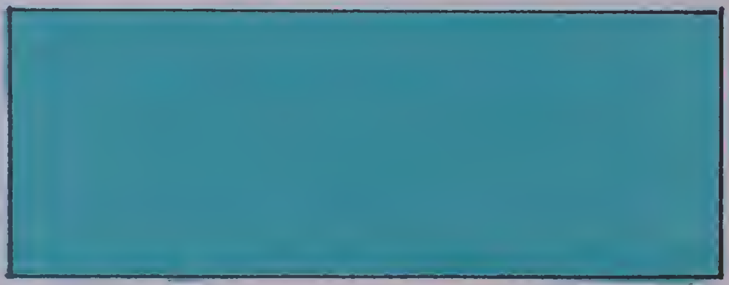


How many ways can you fold the shape
so that the 2 halves are congruent?

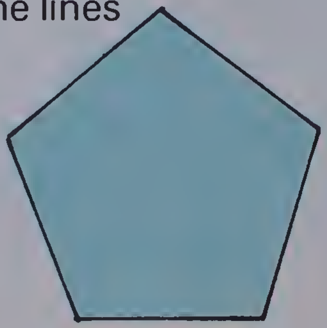


A square has 4 lines of symmetry.

How many lines of symmetry
has a rectangle?
Trace the shape. Cut it out.
Fold to find the lines of symmetry.

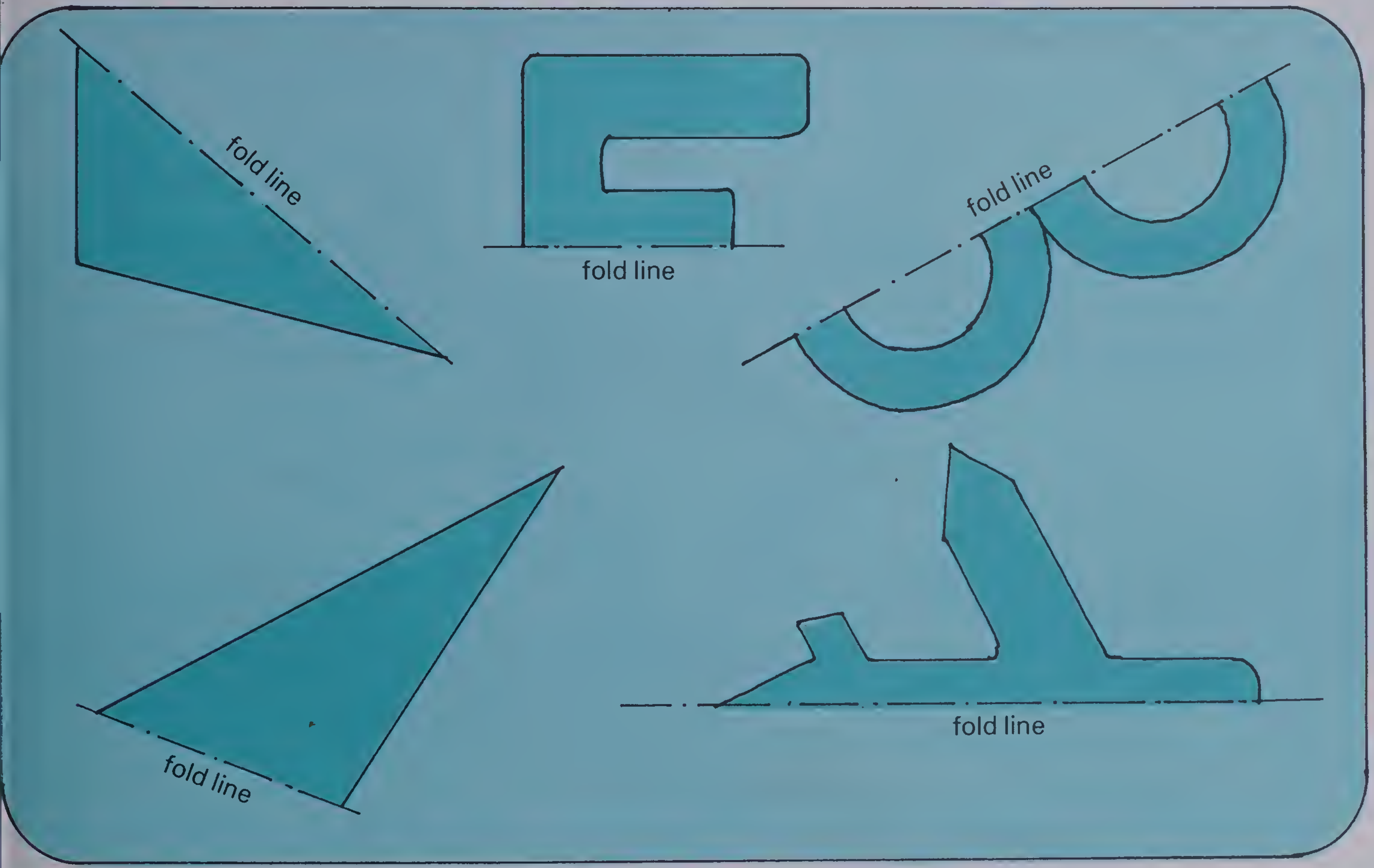


How many lines of symmetry
has a pentagon?
Trace the shape. Cut it out.
Fold to find the lines
of symmetry.

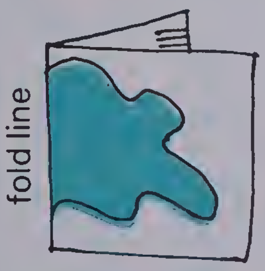


IN ACTION

1. You can only see half of each shape.
   Trace each one and try to draw the other half.
   Now fold your paper and cut out the shape.
   Does your drawing match the shape that you traced?


fold line
fold line
fold line
fold line
fold line

2. a) Fold a piece of paper so that there are 2 congruent pieces. Sketch and cut out a shape that has 1 line of symmetry. Draw the line of symmetry.



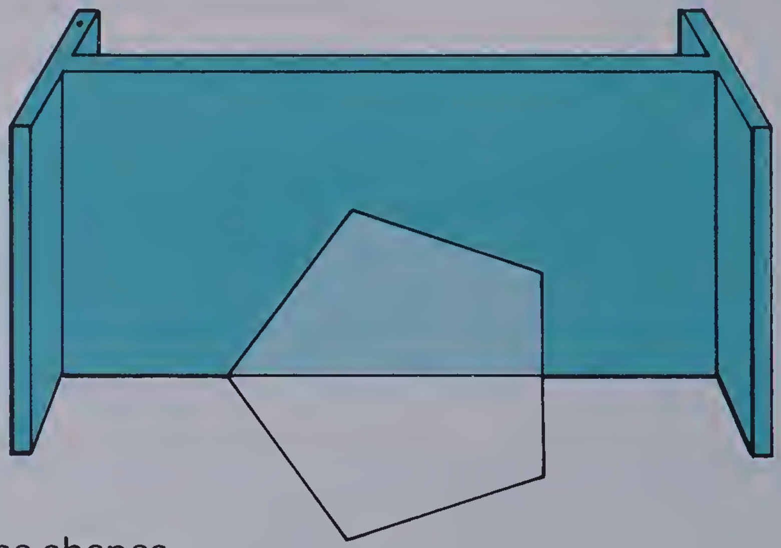
b) Fold a piece of paper, sketch and cut out a shape that has 2 lines of symmetry. Draw the lines of symmetry.

c) Fold a piece of paper, sketch and cut out a shape that has 4 lines of symmetry.

Lines of Symmetry

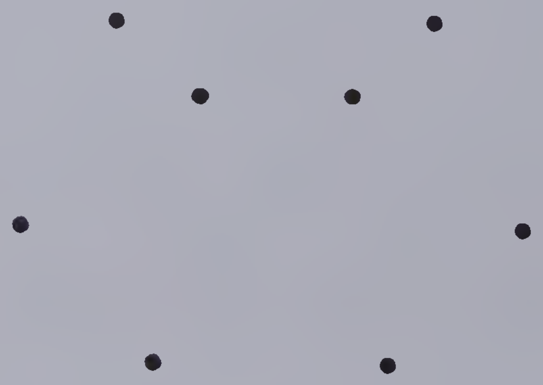
A red plastic mirror can be helpful in finding lines of symmetry.

Place the mirror on the shape.
Move the mirror back and forth
until the image you see in the
mirror matches the shape on
the page.

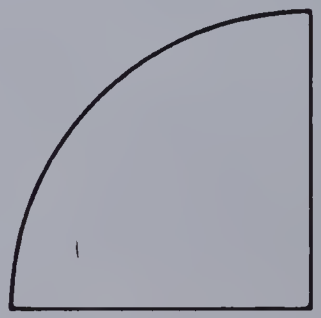


Trace these shapes.
Draw the lines of symmetry
by tracing along the edge of the mirror.

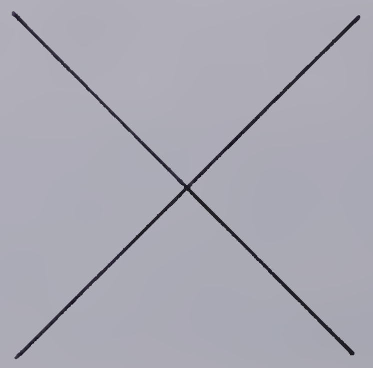
a)



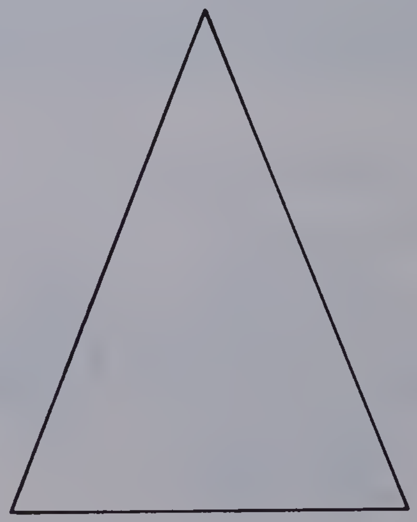
b)



c)

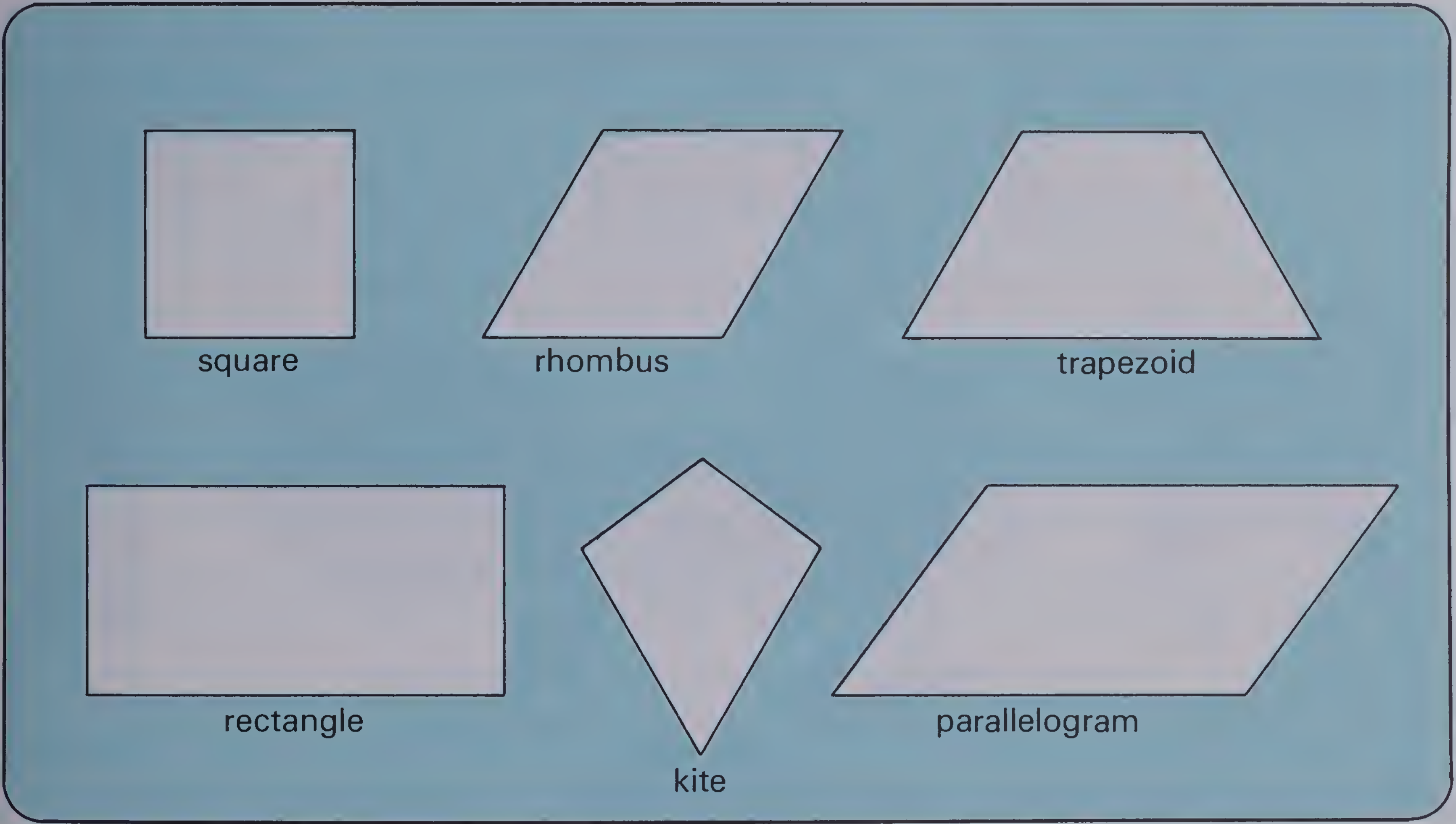


d)



IN ACTION

1. a) Trace these quadrilaterals.
Locate and draw all the lines of symmetry for each.

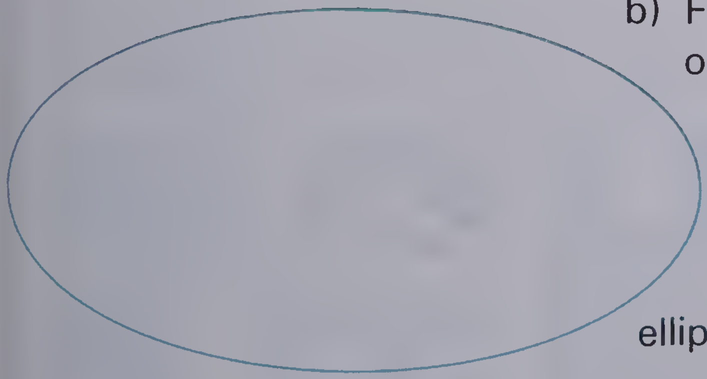

square
rhombus
trapezoid
rectangle
kite
parallelogram

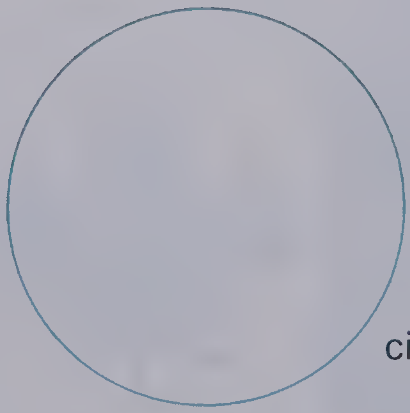
b) Which quadrilateral does not have any lines of symmetry?

2. Trace these figures.

a) Find and draw the lines of symmetry of an ellipse.

b) Find and draw some lines of symmetry of a circle.





c) What is the point at which the lines of symmetry of each figure intersect?

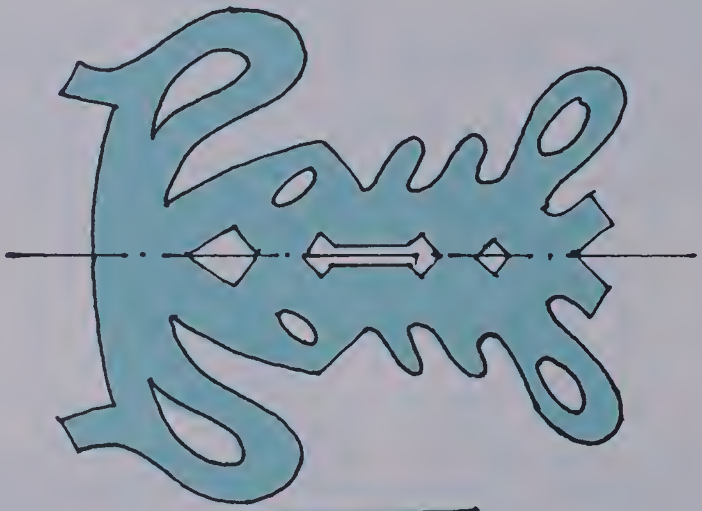
3. Find the letters of the alphabet that have 1 or more than 1 line of symmetry.

Use the letters you find to make a word that has a line of symmetry.

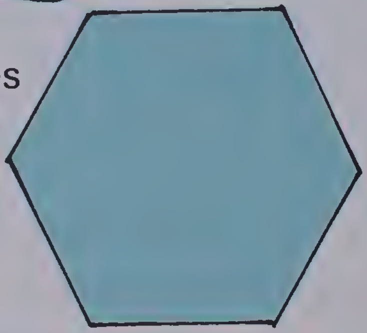
TOMATO

BOB

4. Use your name to create a symmetrical design.

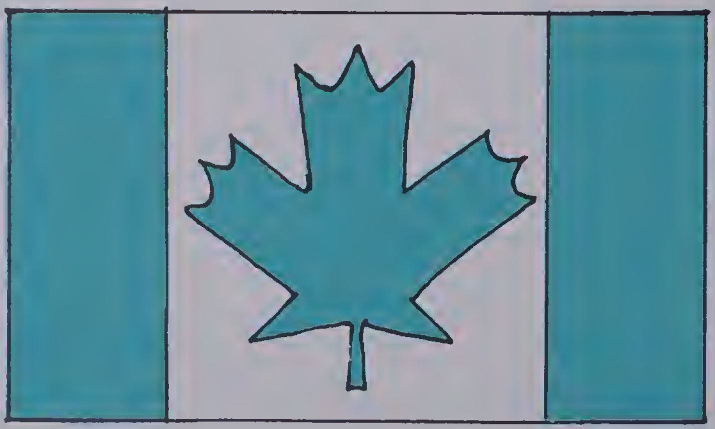


5. a) How many lines of symmetry does this hexagon have?

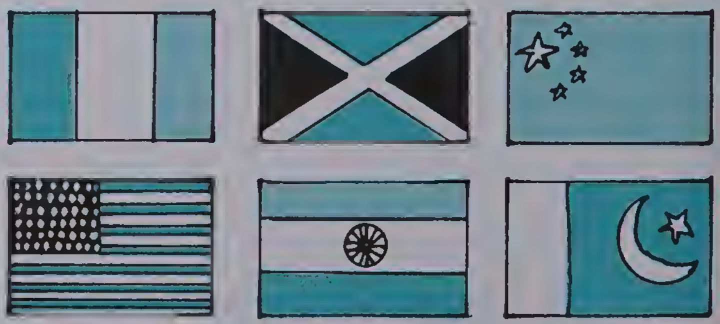


b) Draw a hexagon which has 0 lines of symmetry.

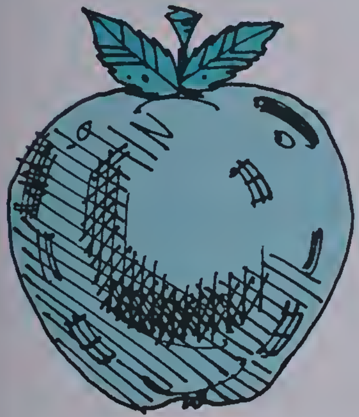
6. a) Find a line of symmetry for the Canadian flag.

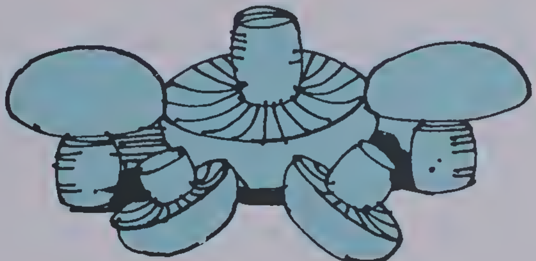


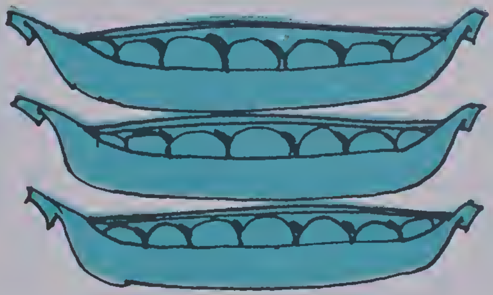
b) Find pictures of flags of other countries. Which flags have lines of symmetry?



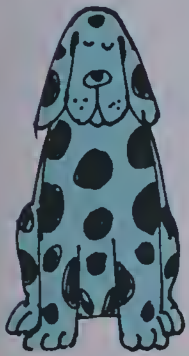
A Symmetrical Display for Your Classroom

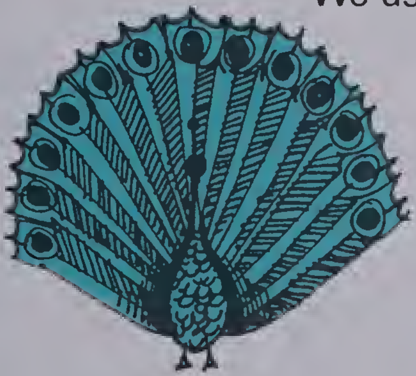


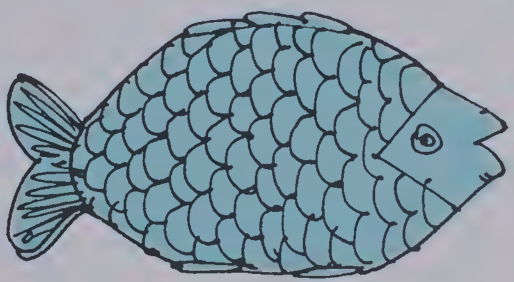


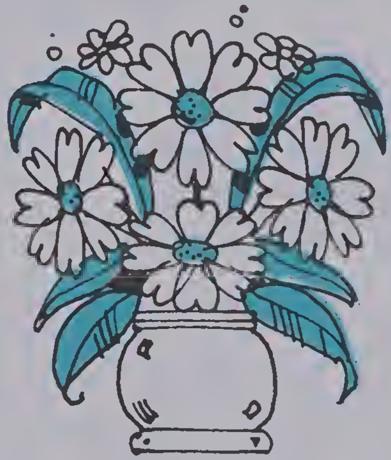


Everywhere we look we see objects that have symmetry.
Nature creates much beauty by using symmetrical patterns.
We have learned from nature.
We use symmetrical patterns too.

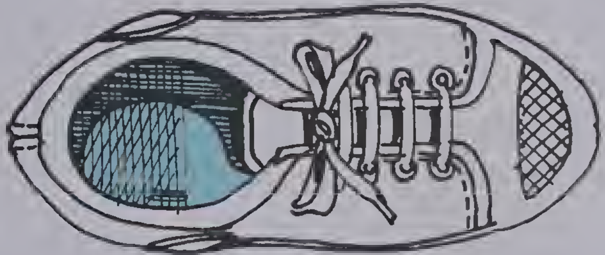


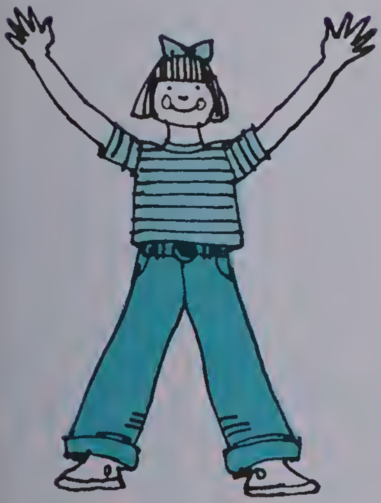




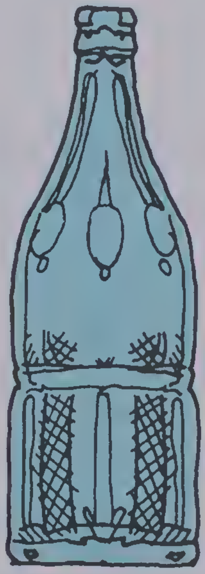


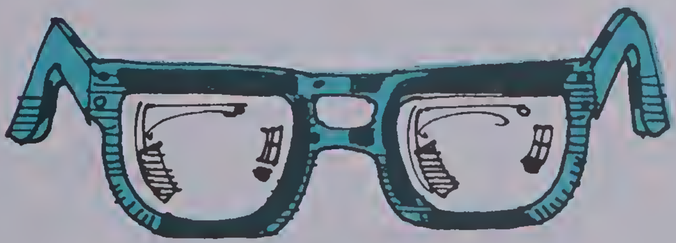
Find examples and pictures of symmetry in nature.
Help prepare a display for your classroom.





Find examples and pictures
of people's use of symmetry.
Help prepare a display for your classroom.





MULTIPLICATION AND DIVISION/Multiplying by 0.1

Think about the patterns.

18 × 100 = 1800
18 × 10 = 180
18 × 1 = 18
18 × 0.1 = 1.8

8 × 100 = 800
8 × 10 = 80
8 × 1 = 8
8 × 0.1 = 0.8

0.8 × 100 = 80
0.8 × 10 = 8
0.8 × 1 = 0.8
0.8 × 0.1 = 0.08

1.8 × 100 = 180
1.8 × 10 = 18
1.8 × 1 = 1.8
1.8 × 0.1 = 0.18

When you multiply by 10, you move the decimal point one place to the right.

When you multiply by 0.1 ($\frac{1}{10}$), how do you move the decimal point?

IN ACTION

1. Complete the patterns.

a) 27 × 100 = ?
27 × 10 = ?
27 × 1 = ?
27 × 0.1 = ?

b) 7 × 100 = ?
7 × 10 = ?
7 × 1 = ?
7 × 0.1 = ?

c) 0.7 × 100 = ?
0.7 × 10 = ?
0.7 × 1 = ?
0.7 × 0.1 = ?

d) 1.7 × 100 = ?
1.7 × 10 = ?
1.7 × 1 = ?
1.7 × 0.1 = ?

e) 127 × 100 = ?
127 × 10 = ?
127 × 1 = ?
127 × 0.1 = ?

f) 927 × 100 = ?
927 × 10 = ?
927 × 1 = ?
927 × 0.1 = ?

g) 11 × 100 = ?
11 × 10 = ?
11 × 1 = ?
11 × 0.1 = ?

h) 100 × 100 = ?
100 × 10 = ?
100 × 1 = ?
100 × 0.1 = ?

2. Multiply by 0.1.

a) 19 b) 1.9 c) 119 d) 11.9 e) 100 f) 10 g) 1
h) 0.1 i) 200 j) 20 k) 2 l) 0.2 m) 37 n) 49
o) 128 p) 659 q) 75.8 r) 585 s) 85 t) 99 u) 9.9

3. Complete.

a) 19 × 0.1 = ?
19 ÷ 10 = ?

b) 47 × 0.1 = ?
47 ÷ 10 = ?

c) 6 × 0.1 = ?
6 ÷ 10 = ?

d) 1 × 0.1 = ?
1 ÷ 10 = ?

e) 264 × 0.1 = ?
264 ÷ 10 = ?

What is your conclusion?

Dividing by 0.1

Think about the patterns.

$17 \div 100 = 0.17$
$17 \div 10 = 1.7$
$17 \div 1 = 17$
$17 \div 0.1 = 170$

$7 \div 100 = 0.07$
$7 \div 10 = 0.7$
$7 \div 1 = 7$
$7 \div 0.1 = 70$

$117 \div 100 = 1.17$
$117 \div 10 = 11.7$
$117 \div 1 = 117$
$117 \div 0.1 = 1170$

$1 \div 100 = 0.01$
$1 \div 10 = 0.1$
$1 \div 1 = 1$
$1 \div 0.1 = 10$

When you divide by 10, you move the decimal point one place to the left.

When you divide by 0.1 ($\frac{1}{10}$), how do you move the decimal point?

IN ACTION

1. Complete the patterns.

a) $14 \div 100 = ?$
$14 \div 10 = ?$
$14 \div 1 = ?$
$14 \div 0.1 = ?$

b) $4 \div 100 = ?$
$4 \div 10 = ?$
$4 \div 1 = ?$
$4 \div 0.1 = ?$

c) $114 \div 100 = ?$
$114 \div 10 = ?$
$114 \div 1 = ?$
$114 \div 0.1 = ?$

d) $10 \div 100 = ?$
$10 \div 10 = ?$
$10 \div 1 = ?$
$10 \div 0.1 = ?$

e) $115 \div 0.1 = ?$
$15 \div 0.1 = ?$
$1.5 \div 0.1 = ?$
$1.15 \div 0.1 = ?$

f) $8 \div 0.1 = ?$
$0.8 \div 0.1 = ?$
$0.18 \div 0.1 = ?$
$0.08 \div 0.1 = ?$

g) $10 \div 0.1 = ?$
$1 \div 0.1 = ?$
$0.1 \div 0.1 = ?$
$0.01 \div 0.1 = ?$

h) $11 \div 0.1 = ?$
$1 \div 0.1 = ?$
$0.1 \div 0.1 = ?$
$0.11 \div 0.1 = ?$

2. Divide by 0.1.

a) 23
b) 6
c) 112
d) 5
e) 0.5
f) 0.05
g) 0.15
h) 275
i) 37
j) 4
k) 0.3
l) 0.36
m) 0.07
n) 0.09

3. Complete.

a) $16 \div 0.1 = ?$
$16 \times 10 = ?$

b) $2 \div 0.1 = ?$
$2 \times 10 = ?$

c) $0.4 \div 0.1 = ?$
$0.4 \times 10 = ?$

d) $0.17 \div 0.1 = ?$
$0.17 \times 10 = ?$

e) $0.08 \div 0.1 = ?$
$0.08 \times 10 = ?$

f) $125 \div 0.1 = ?$
$125 \times 10 = ?$

g) $349 \div 0.1 = ?$
$349 \times 10 = ?$

h) $1 \div 0.1 = ?$
$1 \times 10 = ?$

What is your conclusion?

Multiplying and Dividing by 100, 10, 1, 0.1

Be certain that you know which way to move the decimal point.

1.4 × 100 = 140
1.4 × 10 = 14
1.4 × 1 = 1.4
1.4 × 0.1 = 0.14

140 ÷ 100 = 1.4
14 ÷ 10 = 1.4
1.4 ÷ 1 = 1.4
0.14 ÷ 0.1 = 1.4

IN ACTION

1. Multiply.
   a) (3.6, 100)
   b) (17.2, 100)
   c) (0.15, 100)
   d) (2.8, 0.1)
   e) (0.4, 0.1)
   f) (8.9, 10)
   g) (0.16, 10)
   h) (2.5, 0.1)
   i) (0.07, 100)
   j) (0.11, 10)
   k) (123, 0.1)
   l) (485, 0.1)
   m) (300, 0.1)
   n) (1.11, 100)
   o) (0.47, 0.1)

2. For each number pair, divide the first number by the second.
   a) (894, 100)
   b) (27.5, 10)
   c) (3.8, 0.1)
   d) (0.56, 0.1)
   e) (1.8, 10)
   f) (72, 10)
   g) (29, 100)
   h) (31, 0.1)
   i) (63, 100)
   j) (90, 0.1)
   k) (588, 0.1)
   l) (962, 10)
   m) (752, 100)
   n) (843, 0.1)
   o) (0.1, 10)

3. Complete the charts.

Number	Operation	Answer	Number	Operation	Answer
3.56	× 100		1.7	× 0.1	
8.2		82	679	÷ 100	
4.7		0.47	34	÷ 10	
37	÷ 100		1.08	× 10	
0.6	× 0.1		2.2	÷ 0.1	
0.79	÷ 0.1		65	× 0.1	
0.11		11	1.01	× 100	
435	× 0.1		1.1	× 0.1	
6.5	÷ 10		7.36	÷ 100	
1.01	× 100		49.6		4.96

Multiplying by a Decimal

Find 29 × 6.

$$\begin{array}{r} 29 \\ \underline{6} \\ 174 \end{array}$$

Think 54 12,17

Record 4 17

Find 29 × 0.6.

$$\begin{array}{r} 29 \\ \underline{0.6} \\ 17.4 \end{array}$$

Check:

29 × 6 is about 30 × 6
or 180

$29 \times 0.6 < 29 \times 1$
or 29

Place the decimal point as shown.
There is 1 place after the decimal point in the factors.
There is 1 place after the decimal point in the product.

IN ACTION

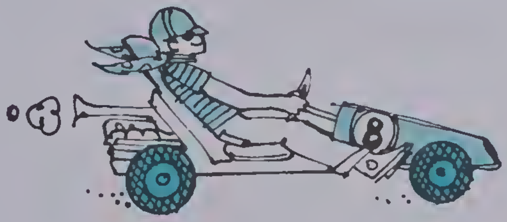
1. Multiply.

a) $\begin{array}{r} 34 \\ \underline{4} \end{array}$ $\begin{array}{r} 34 \\ \underline{0.4} \end{array}$ b) $\begin{array}{r} 47 \\ \underline{5} \end{array}$ $\begin{array}{r} 47 \\ \underline{0.5} \end{array}$ c) $\begin{array}{r} 58 \\ \underline{7} \end{array}$ $\begin{array}{r} 58 \\ \underline{0.7} \end{array}$ d) $\begin{array}{r} 69 \\ \underline{3} \end{array}$ $\begin{array}{r} 69 \\ \underline{0.3} \end{array}$

e) $\begin{array}{r} 76 \\ \underline{6} \end{array}$ $\begin{array}{r} 76 \\ \underline{0.6} \end{array}$ f) $\begin{array}{r} 81 \\ \underline{9} \end{array}$ $\begin{array}{r} 81 \\ \underline{0.9} \end{array}$ g) $\begin{array}{r} 29 \\ \underline{8} \end{array}$ $\begin{array}{r} 29 \\ \underline{0.8} \end{array}$ h) $\begin{array}{r} 56 \\ \underline{7} \end{array}$ $\begin{array}{r} 56 \\ \underline{0.7} \end{array}$

2. Multiply.

a) 37 by 0.5 b) 62 by 0.7 c) 74 by 0.4 d) 85 by 0.6 e) 93 by 0.4
f) 79 by 0.7 g) 68 by 0.6 h) 83 by 0.9 i) 94 by 0.9 j) 87 by 0.8



3. The gocart track is 0.8 km long.
How far would you travel in 24 laps?

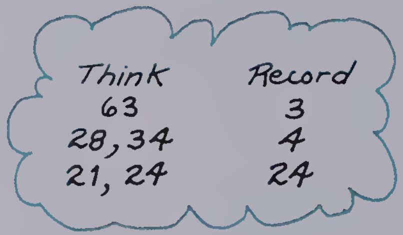
4. The indoor track is 0.4 km long. How far does a runner go in 17 laps?

5. About what is the mass of 12 grapefruit, if each one has a mass of about 0.7 kg?

Multiplying by a Decimal

Find 349 × 7.

$$\begin{array}{r} 349 \\ \underline{7} \\ 2443 \end{array}$$



Find 349 × 0.7.

$$\begin{array}{r} 349 \\ \underline{0.7} \\ 244.3 \end{array}$$

Check:

349 × 7 is about 350 × 7
or 2450

349 × 0.7 < 349 × 1
or 349

Place the decimal point as shown.
There is 1 place after the decimal point in the factors.
There is 1 place after the decimal point in the product.

IN ACTION

1. Multiply.

a) $\begin{array}{r} 254 \\ \underline{6} \end{array}$ $\begin{array}{r} 254 \\ \underline{0.6} \end{array}$ b) $\begin{array}{r} 467 \\ \underline{4} \end{array}$ $\begin{array}{r} 467 \\ \underline{0.4} \end{array}$ c) $\begin{array}{r} 329 \\ \underline{5} \end{array}$ $\begin{array}{r} 329 \\ \underline{0.5} \end{array}$ d) $\begin{array}{r} 583 \\ \underline{8} \end{array}$ $\begin{array}{r} 583 \\ \underline{0.8} \end{array}$

e) $\begin{array}{r} 749 \\ \underline{7} \end{array}$ $\begin{array}{r} 749 \\ \underline{0.7} \end{array}$ f) $\begin{array}{r} 836 \\ \underline{9} \end{array}$ $\begin{array}{r} 836 \\ \underline{0.9} \end{array}$ g) $\begin{array}{r} 627 \\ \underline{3} \end{array}$ $\begin{array}{r} 627 \\ \underline{0.3} \end{array}$ h) $\begin{array}{r} 465 \\ \underline{2} \end{array}$ $\begin{array}{r} 465 \\ \underline{0.2} \end{array}$

2. Multiply.

a) 123 by 0.7 b) 241 by 0.5 c) 362 by 0.6 d) 478 by 0.4 e) 983 by 0.2
f) 588 by 0.3 g) 629 by 0.8 h) 837 by 0.9 i) 986 by 0.7 j) 719 by 0.9

3. Solve.

a) $k = 509 \times 0.4$ b) $m = 640 \times 0.8$
c) $n = 937 \times 0.6$ d) $p = 859 \times 0.8$
e) $y = 728 \times 0.9$ f) $a = 489 \times 0.7$
g) $w = 735 \times 0.5$ h) $q = 989 \times 0.9$

4. Sandra rides 0.9 km to school. If she makes 378 trips in a school year (2 trips a day), how far does she ride?

Multiplying Decimals

Find 849 × 7.

$$\begin{array}{r} 849 \\ 7 \\ \hline 5943 \end{array}$$

Think	Record
63	3
28, 34	4
56, 59	59

Find 84.9 × 7.

$$\begin{array}{r} 84.9 \\ 7 \\ \hline 594.3 \end{array}$$

Check:
84.9 × 7 is about
80 × 7 or 560

The factors have 1 place after the decimal point. The product has 1 place after the decimal point.

Find 8.49 × 7.

$$\begin{array}{r} 8.49 \\ 7 \\ \hline 59.43 \end{array}$$

Check:
8.49 × 7 is about
8 × 7 or 56

The factors have ? places after the decimal point. The product has ? places after the decimal point.

Find 0.849 × 7.

$$\begin{array}{r} 0.849 \\ 7 \\ \hline 5.943 \end{array}$$

Check:
0.849 × 7 is about
1 × 7 or 7

What is your rule?

IN ACTION

1. Complete.

a) 537 × 6 = 3222
53.7 × 6 = ?
5.37 × 6 = ?
0.537 × 6 = ?

b) 489 × 7 = 3423
48.9 × 7 = ?
4.89 × 7 = ?
0.489 × 7 = ?

c) 968 × 9 = 8712
96.8 × 9 = ?
9.68 × 9 = ?
0.968 × 9 = ?

2. Multiply. Check by estimating.

a) $\begin{array}{r} 68.2 \\ 8 \\ \hline \end{array}$ b) $\begin{array}{r} 7.49 \\ 6 \\ \hline \end{array}$ c) $\begin{array}{r} 0.608 \\ 9 \\ \hline \end{array}$ d) $\begin{array}{r} 53.5 \\ 8 \\ \hline \end{array}$ e) $\begin{array}{r} 9.41 \\ 7 \\ \hline \end{array}$ f) $\begin{array}{r} 98.7 \\ 5 \\ \hline \end{array}$

3. Each side of a regular hexagon (sides all the same length) is 3.7 cm. What is the perimeter?

4. Find the products.

a) 0.708 × 5 b) 9.43 × 8 c) 5.69 × 7 d) 39.8 × 6 e) 47.9 × 9

Multiplying Decimals

Find 973 × 6.

$$\begin{array}{r} 973 \\ \underline{6} \\ 5838 \end{array}$$

Think	Record
18	8
42, 43	3
54, 58	58

Find 97.3 × 0.6. Find 9.73 × 0.6. Find 0.973 × 0.6.

Think.
There are 2 places after the decimal point in the factors. There are 2 places after the decimal point in the product.

What is your rule for placing the decimal point?

97.3 × 0.6 = 58.38
Check:
97.3 × 0.6 < 97 × 1
or 97

9.73 × 0.6 = 5.838
Check:
9.73 × 0.6 < 9.8 × 1
or 9.8

0.973 × 0.6 = 0.5838
Check:
0.973 × 0.6 < 1 × 1
or 1

IN ACTION

1. Complete.
   - a) 849 × 7 = 5943
     84.9 × 0.7 = ?
     8.49 × 0.7 = ?
     0.849 × 0.7 = ?
   - b) 604 × 9 = 5436
     60.4 × 0.9 = ?
     6.04 × 0.9 = ?
     0.604 × 0.9 = ?
   - c) 897 × 8 = 7176
     89.7 × 0.8 = ?
     8.97 × 0.8 = ?
     0.897 × 0.8 = ?

2. Multiply.

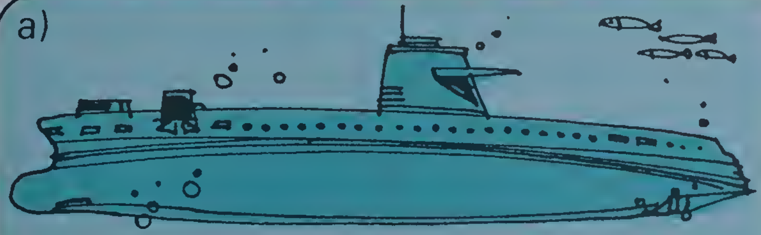
a) $\begin{array}{r} 5.48 \\ \underline{0.3} \end{array}$ b) $\begin{array}{r} 49.1 \\ \underline{0.9} \end{array}$ c) $\begin{array}{r} 0.716 \\ \underline{0.8} \end{array}$ d) $\begin{array}{r} 19.9 \\ \underline{0.7} \end{array}$ e) $\begin{array}{r} 0.238 \\ \underline{0.6} \end{array}$

f) $\begin{array}{r} 62.7 \\ \underline{0.5} \end{array}$ g) $\begin{array}{r} 73.6 \\ \underline{0.4} \end{array}$ h) $\begin{array}{r} 8.12 \\ \underline{0.9} \end{array}$ i) $\begin{array}{r} 0.913 \\ \underline{0.6} \end{array}$ j) $\begin{array}{r} 0.874 \\ \underline{0.8} \end{array}$

3. Find the products.

a) 0.612 × 7 b) 61.2 × 7 c) 0.967 × 0.9 d) 51.4 × 0.8 e) 1.99 × 0.9

4. a)



WORLD'S FASTEST SUBMARINE

83.4 km/h

TIME	DISTANCE
3 h (hours)	?
7 h (hours)	?

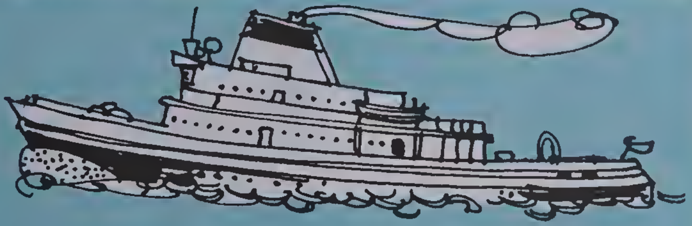
b)

WORLD'S FASTEST OCEAN LINER

65.8 km/h

TIME	DISTANCE
2 h	?
6 h	?

c)



WORLD'S FASTEST TUG

40.2 km/h

TIME	DISTANCE
4 h	?
6 h	?

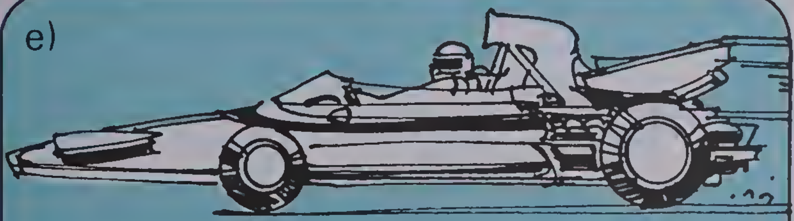
d)

WORLD'S FASTEST HELICOPTER

355.7 km/h

TIME	DISTANCE
2 h	?
4 h	?

e)



WORLD'S FASTEST RACING CAR

283.4 km/h

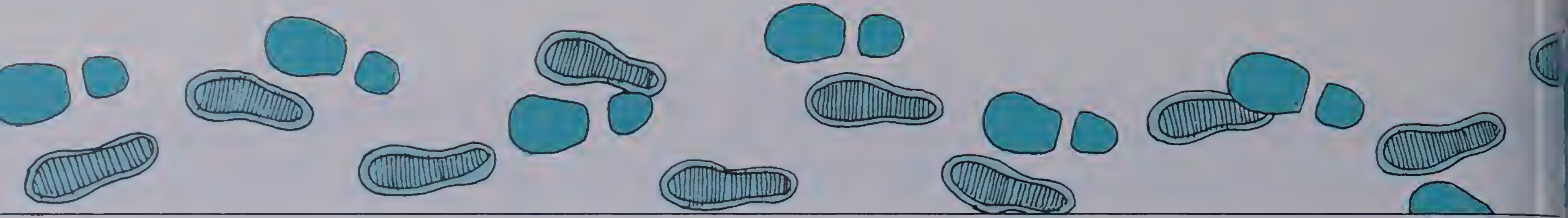
TIME	DISTANCE
3 h	?
5 h	?

f)

WORLD'S FASTEST TRAIN

330.9 km/h

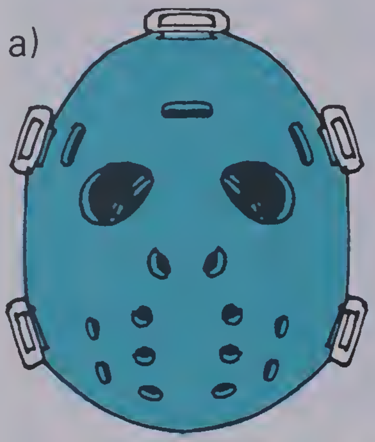
TIME	DISTANCE
2 h	?
5 h	?



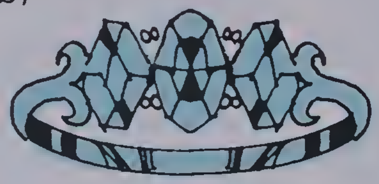
Retrace Your Steps

1. Write the number of lines of symmetry for each object.

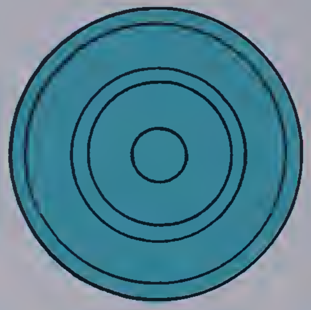
a)



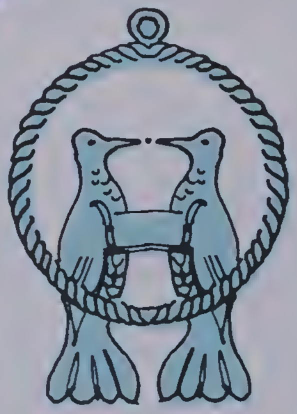
b)



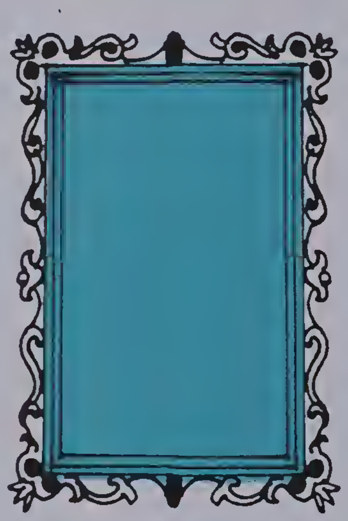
c)



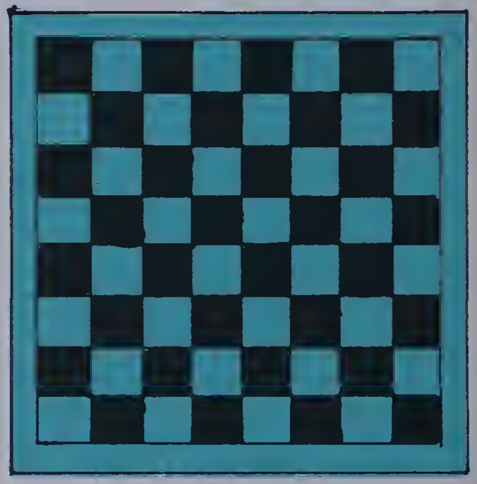
d)



e)



f)



2. Complete the following.

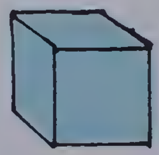
a) 42 × 100 = ?
b) 68 × 0.1 = ?
c) 1.9 × 10 = ?
d) 3.4 × 0.3 = ?
e) 36 × 10 = ?
f) 16.4 × 0.1 = ?
g) 32.4 × 0.1 = ?
h) 29.4 × 1 = ?
i) 9 × 0.1 = ?
j) 300 × 10 = ?
k) 12.4 × 0.3 = ?
l) 6.24 × 0.5 = ?
m) 18 × 1 = ?
n) 5 × 0.1 = ?
o) 4.41 × 100 = ?
p) 0.42 × 0.7 = ?

3. Write division sentences for the multiplication problems in Question 2.

4. Multiply.

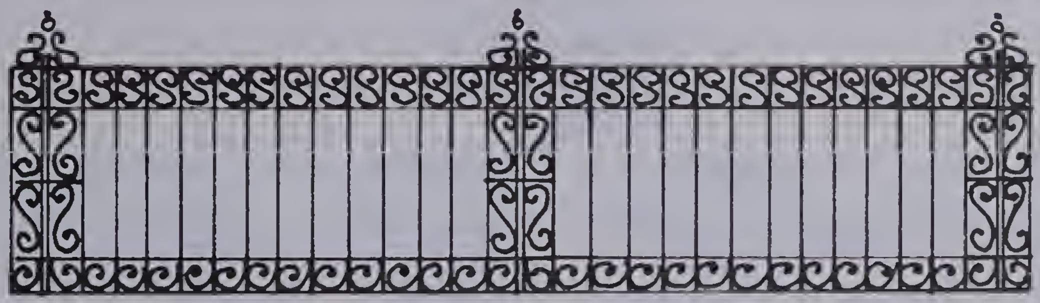
a) 6.19 by 5
b) 26.8 by 6
c) 0.462 by 4
d) 39.4 by 0.2
e) 1.46 by 0.3
f) 54.6 by 0.8
g) 963 by 0.7
h) 63.5 by 0.5
i) 1.06 by 9
j) 0.361 by 2

5. A student needs 30.5 cm of tape to fasten the edges of a cube. How much tape would be needed to fasten 7 of these cubes?

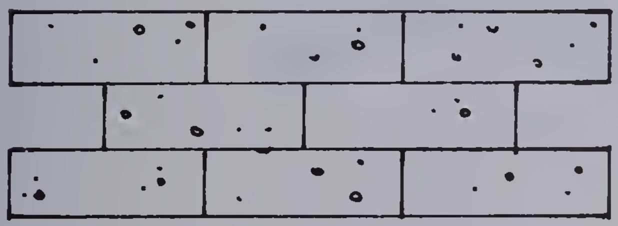


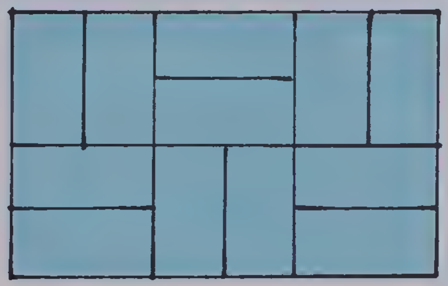
MOTION GEOMETRY/ Patterns

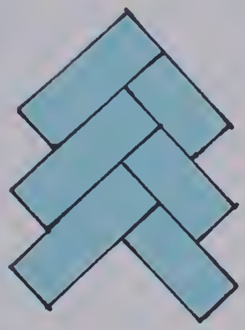
We can find beautiful patterns everywhere.
Do you look for patterns?



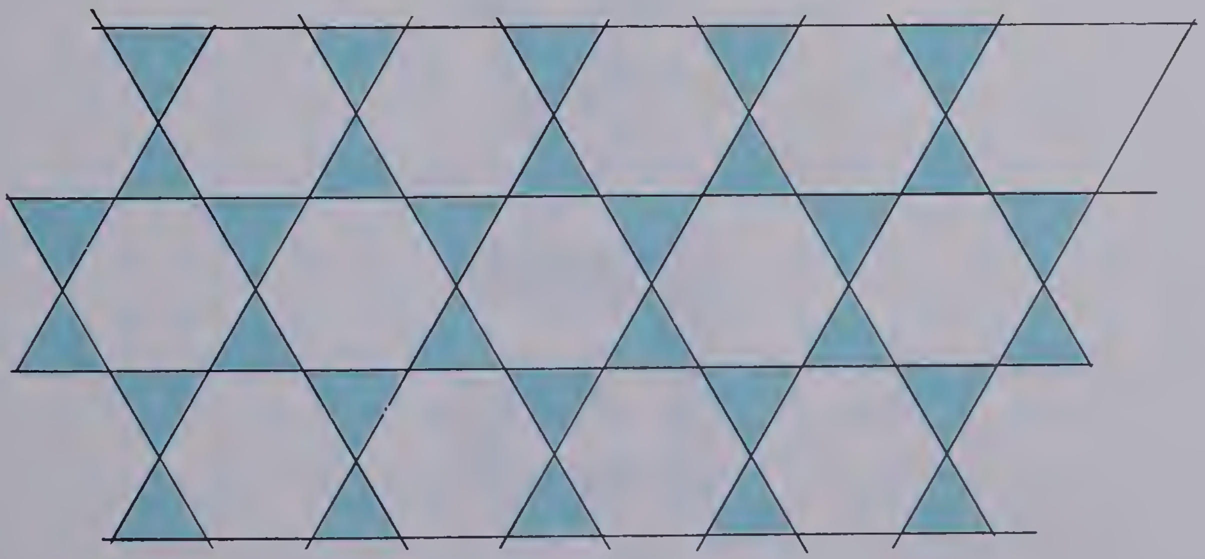
Here are some patterns used to create interesting floors.
Have you seen them?
Many patterns can be made using the same shape.







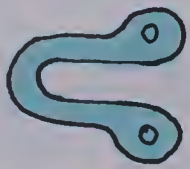
Where else might you find patterns?
Sometimes patterns use just 1 shape like the ones above.
Sometimes more than 1 shape is used.

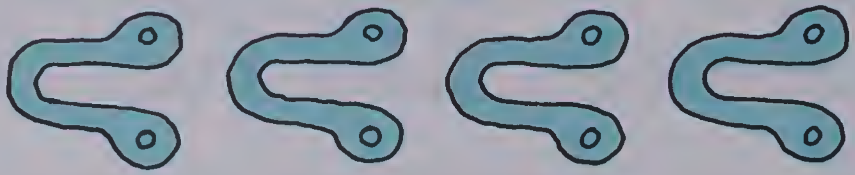


Make a collection of pictures showing beautiful patterns.

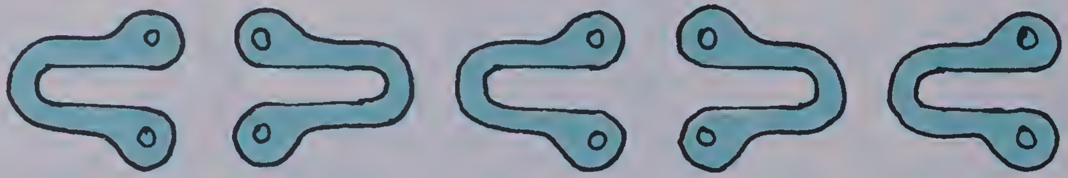
Creating Patterns

Let's look at some ways patterns can be created from a basic shape. Here is the basic shape.

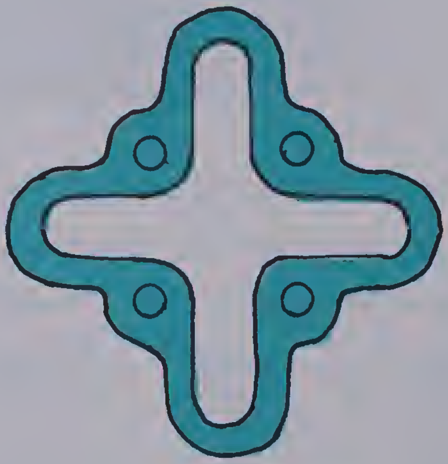




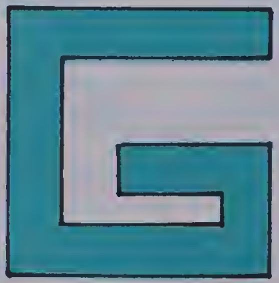
How was this pattern created?



How was this pattern created?



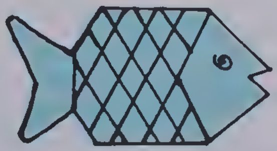
How was this pattern created?

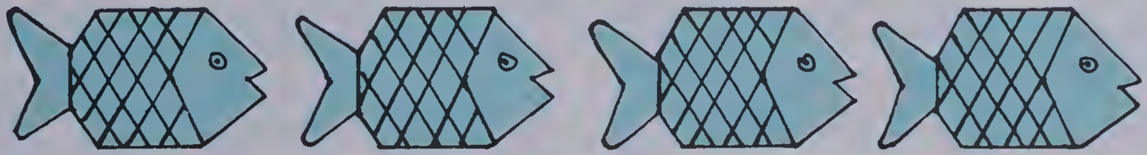


Trace and cut out this shape or make one of your own. Use it to create a pattern.

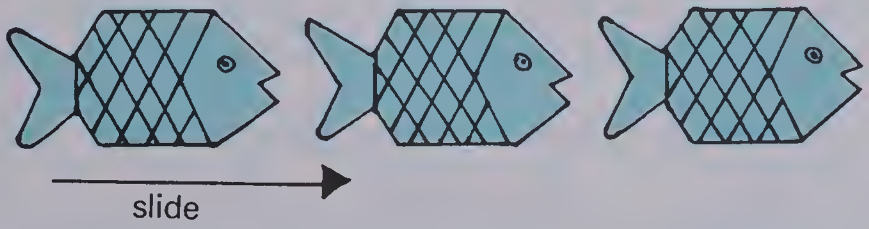
Slides

If you start with this basic shape,

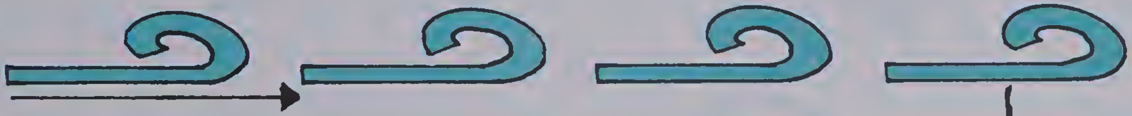




how do you move it to create this pattern?
We slide the shape. We call this motion a **slide.**

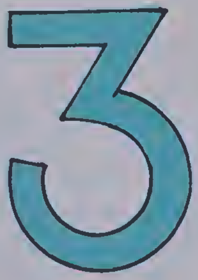


Very often the basic shape is moved the same distance
in the same direction to create a pattern.
We could show the distance and direction by an arrow.

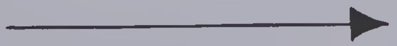


Here is another pattern created by sliding a basic shape.

Trace and cut out this shape.



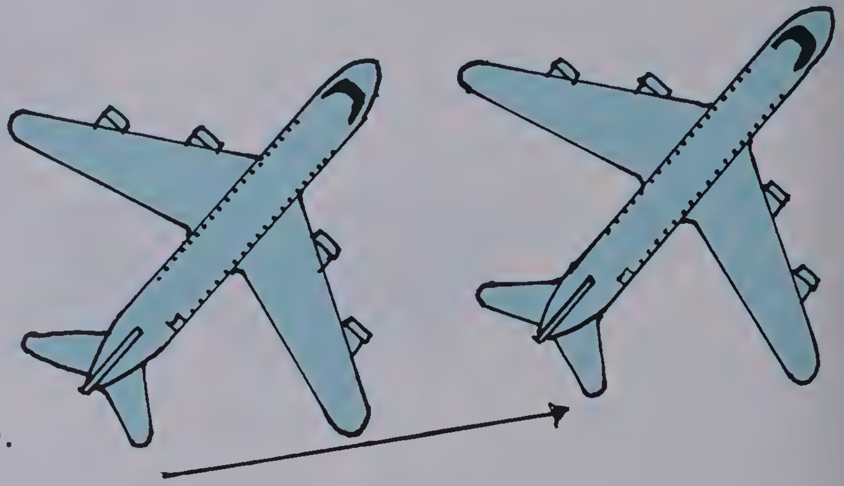
Slide and trace the shape several times to make a pattern.
Use this arrow to tell you how far
and in what direction to move the shape.



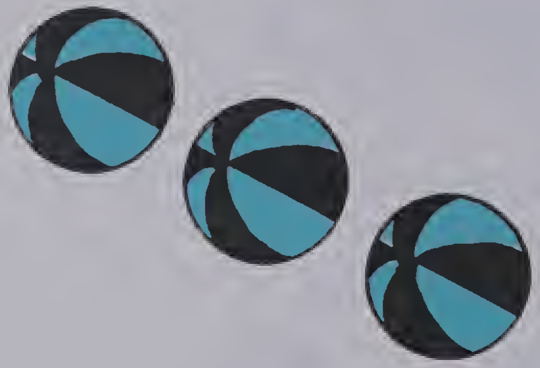
Look for patterns that use slides. Pick out the basic shape.
Notice how far and in what direction the basic shape is moved.

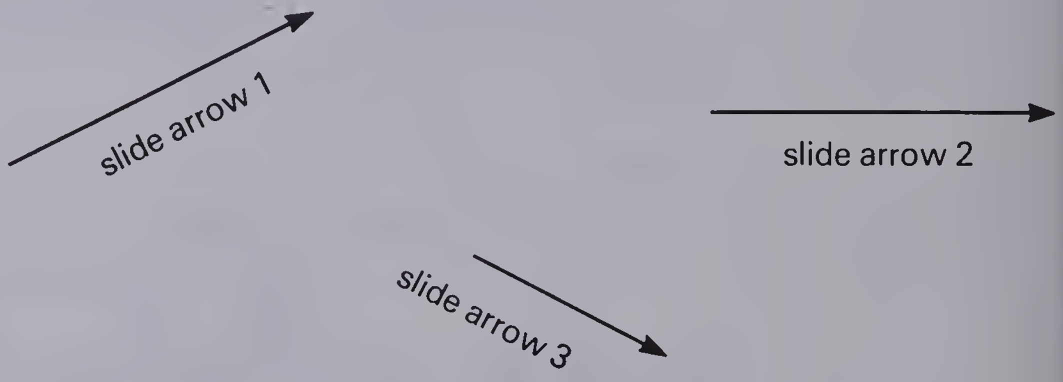
IN ACTION

1. a) Trace the shape of the airplane. Slide the shape along the arrow until it fits on the second airplane. Are the airplanes congruent (same size, same shape)?
   b) Use your tracing to create a pattern in your workbook. Remember, the slide arrow tells you the direction and the distance.

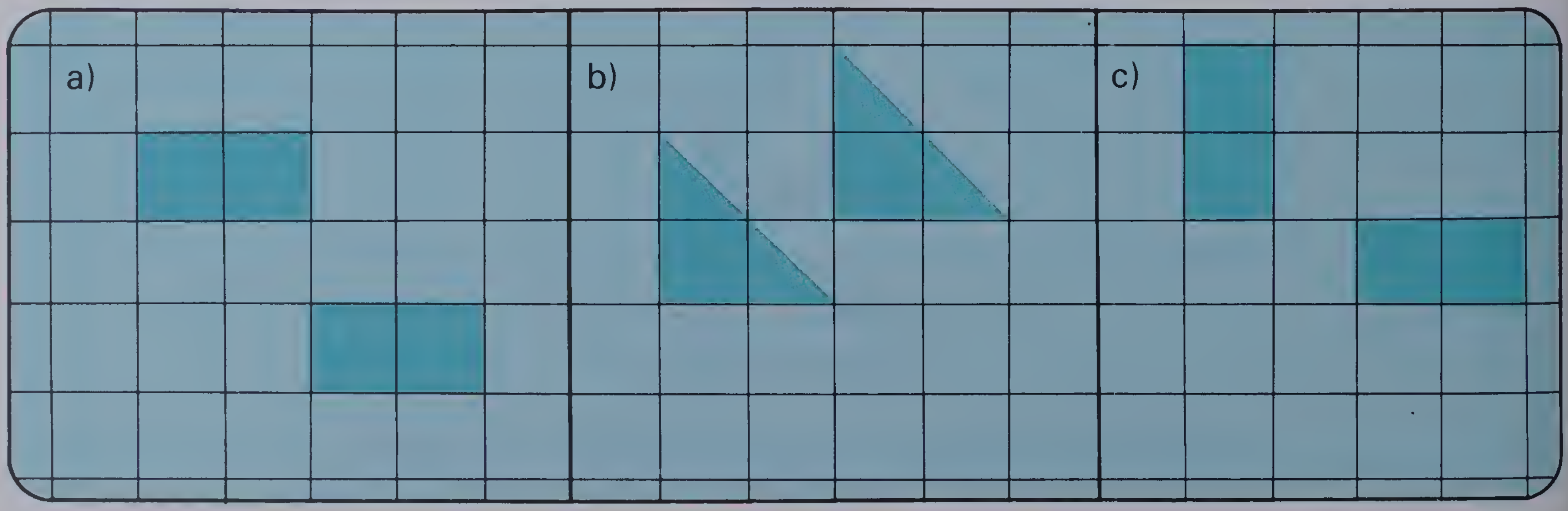


2. Which slide arrow was used in this pattern?



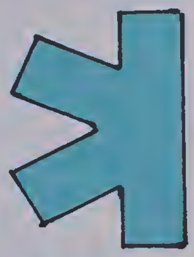


3. In which examples is the second figure formed by sliding the first? Continue the slide patterns. Draw the slide arrow.

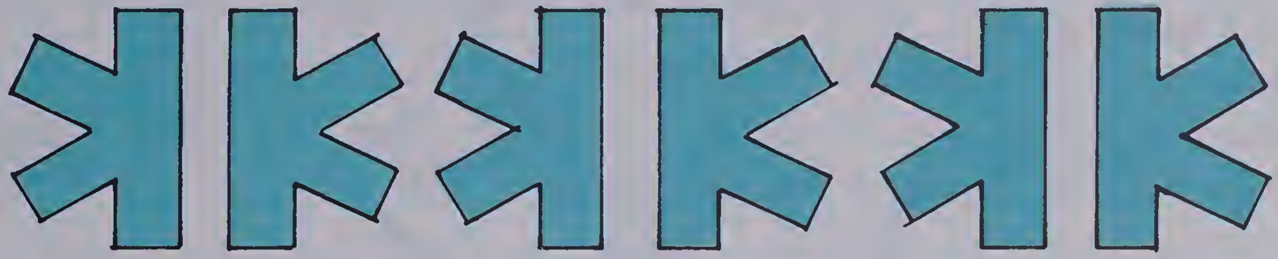


Flips

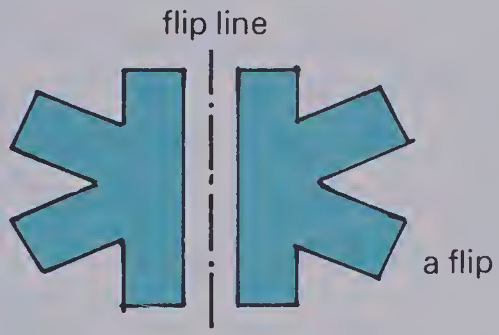
If you start with this basic shape,



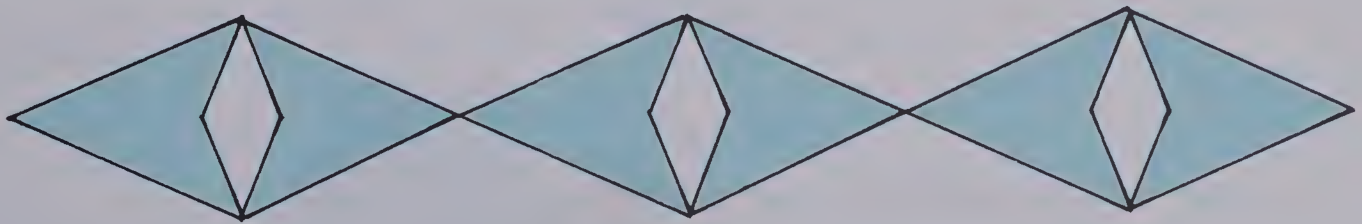
how do you move it to create this pattern?



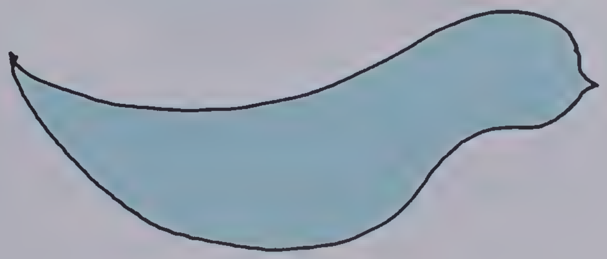
We flip the shape about a line.
We call this motion a **flip.**
We make a flip about a **flip line.**



A flip line can be outside a shape or it can be 1 side of a shape.
Here is another pattern created by flipping a basic shape about a line.
Trace the basic shape that has been used to make the pattern.

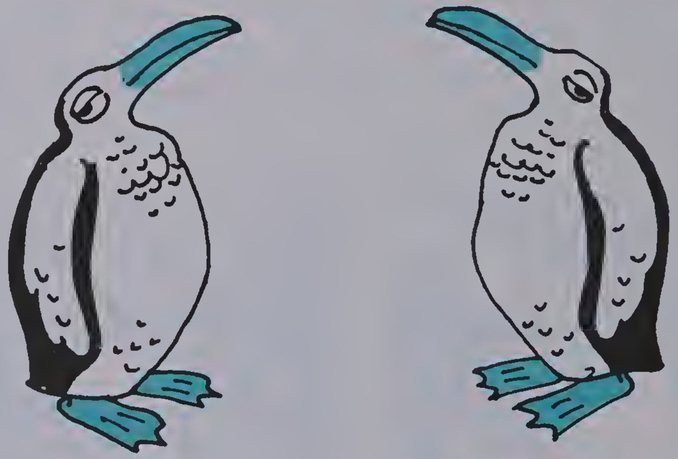


Use a mirror to locate the flip lines.



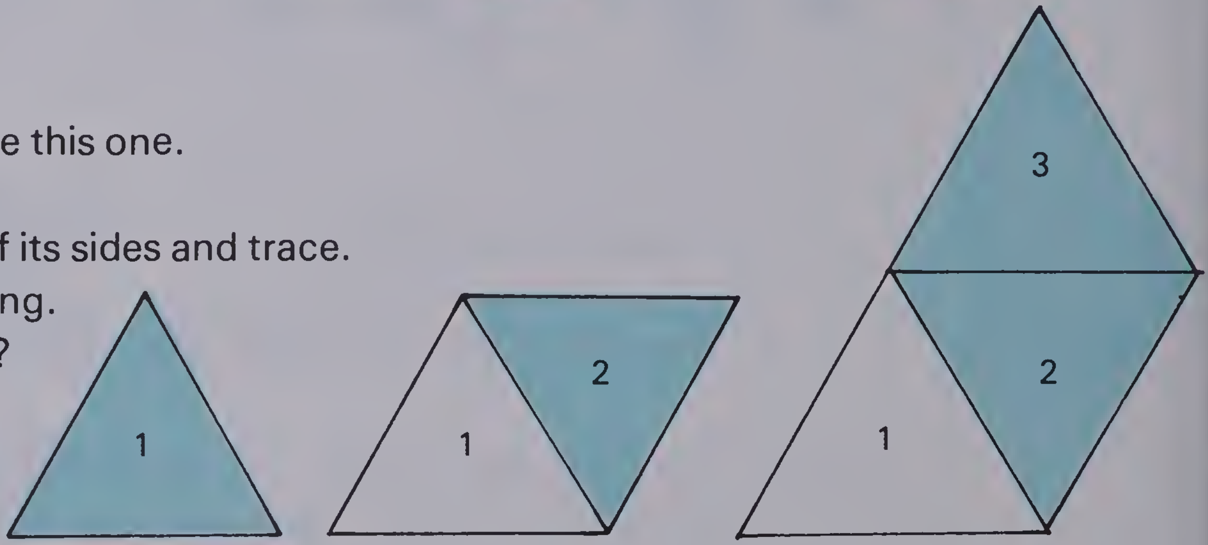
Trace and cut out this shape.
Flip and trace the shape several times to create a pattern.
Look for examples of patterns that use flips. Pick out the basic shape.
Notice how the basic shape has been flipped to create a pattern.

IN ACTION

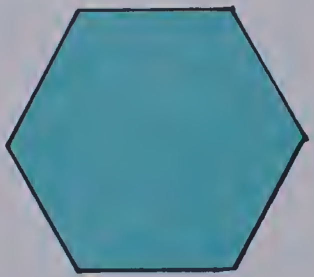


1. a) Use a red plastic mirror to locate the line about which the shape has been flipped.
   b) Test to see whether the shapes are congruent.

2. Make a triangular shape like this one.
   Trace the shape.
   Flip the shape about one of its sides and trace.
   Continue flipping and tracing.
   What figure do you create?

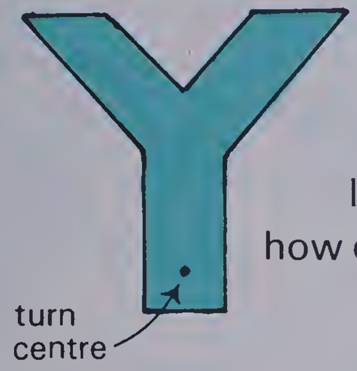


3. Make a hexagonal shape like this one.

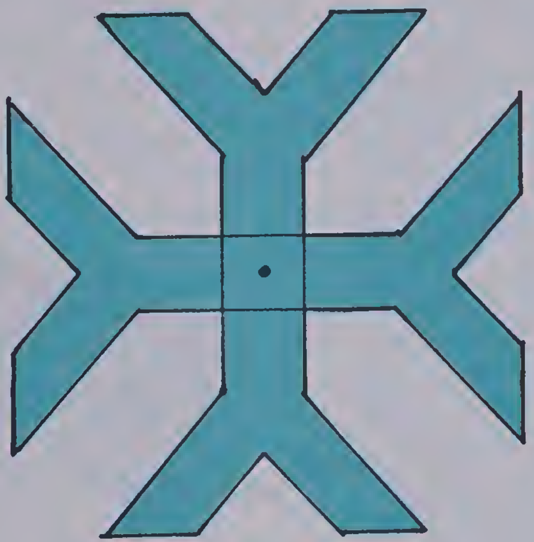


Trace the shape, flip it about one of its sides and trace it.
Continue flipping and tracing to form a pattern.

Turns

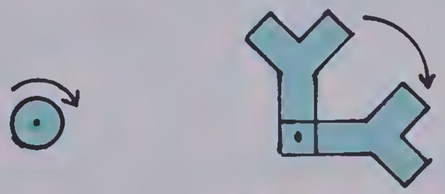


If you start with this basic shape, how do you move it to create this pattern?

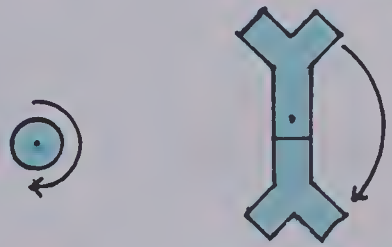


We turn the shape about a point.
We call this motion a **turn.**
We call the point a **turn centre.**

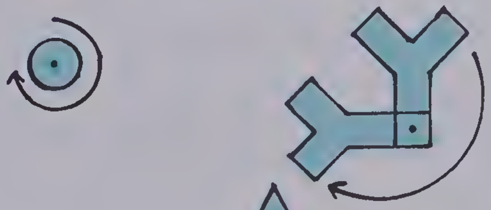
This shows a $\frac{1}{4}$ turn clockwise about the turn centre.

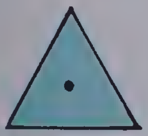


Here is a $\frac{1}{2}$ turn clockwise about the turn centre.

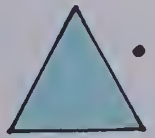


Here is a $\frac{3}{4}$ turn clockwise about the turn centre.

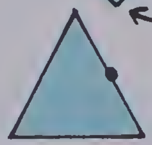




A turn centre
can be inside the shape,



outside
the shape,

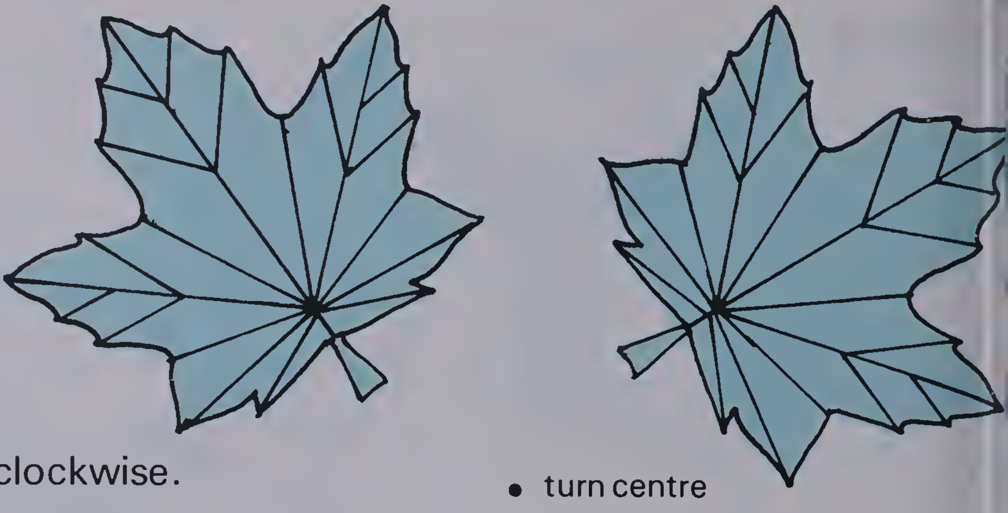


or on
the edge of the shape.

IN ACTION

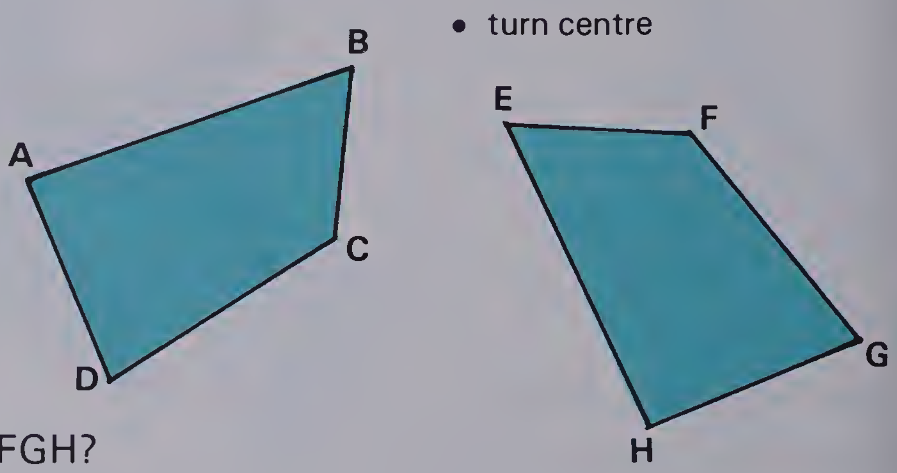
1. Trace the pattern of the leaf on the left.
   Mark the turn centre.
   Place the point of your pencil on the turn centre and turn your tracing $\frac{1}{4}$ turn clockwise.

   Are the 2 shapes congruent?



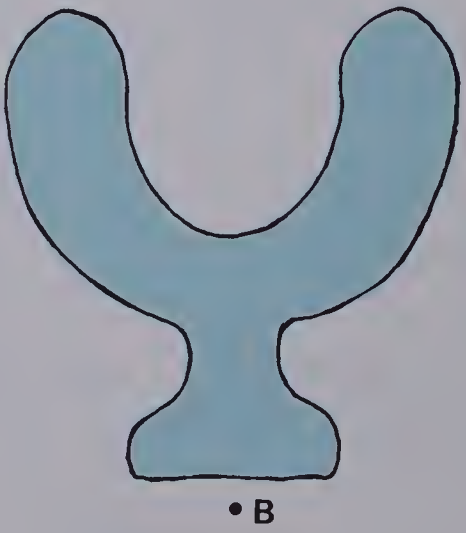
2. Trace the quadrilateral on the left.
   Mark the turn centre.
   Put the point of your pencil on the turn centre and turn your tracing clockwise.

   What size turn did you make before quadrilateral ABCD would fit quadrilateral EFGH?



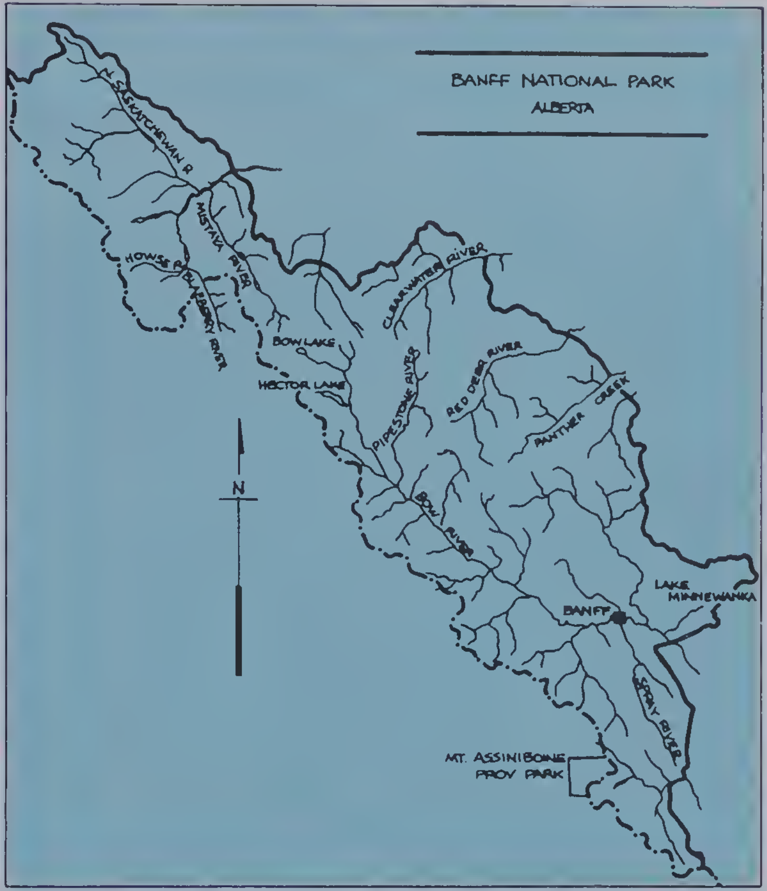
3. Trace and cut out a model of this shape.
   Mark turn centre B.
   Use a pin through turn centre B. Turn the shape through three $\frac{1}{4}$ clockwise turns.

   What pattern do you create?



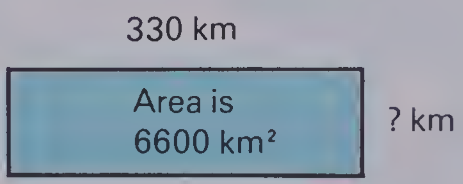
4. Cut out a shape of your own. Mark a turn centre.
   Turn and trace your shape to create a pattern.

Banff National Park


BANFF NATIONAL PARK
ALBERTA
N. SASKATCHEWAN R.
MISTAYA RIVER
HOWSE R.
BLAEBERRY RIVER
BOW LAKE
HECTOR LAKE
CLEARWATER RIVER
PIPESTONE RIVER
RED DEER RIVER
PANTHER CREEK
BOW RIVER
N
BANFF
LAKE MINNEWANKA
SPRAY RIVER
MT. ASSINIBOINE PROV PARK

Rocky National Park was created in 1885 as Canada's first National Park. It had an area of 26 km². Today, with an area of 6693 km², Banff National Park includes Rocky National Park. The east side of the park follows the Rocky Mountains for 338 km. It contains 6 mountain ranges and many river valleys. One of these, the Bow River Valley, has an elevation of 1329 m. The highest point in the park is Mt. Forbes at 3628 m.

1. Approximately how many times greater than 300 is 1300?
2. Approximately how many times higher than the Bow River Valley is Mt. Forbes?
3. What is the difference in elevation between the Bow River Valley and Mt. Forbes?
4. Approximately how many times greater than 25 is 6500? (think: 4 × 25 = 100)
5. Approximately how many times greater is the area of the new park than the area of the old park?
6. The annual snowfall in the park is between 154.4 cm and 203.2 cm. What is the difference?
7. Temperature: (1921) highest recorded temperature 37.7°C
   (1921) lowest recorded temperature −50°C
   How many degrees Celsius are there between the highest and lowest temperatures?
8. Think of the park as a rectangle.
   One side of the park measures 330 km.
   What number multiplied by 330 will give a product of 6600?
   What is the approximate width of the park?

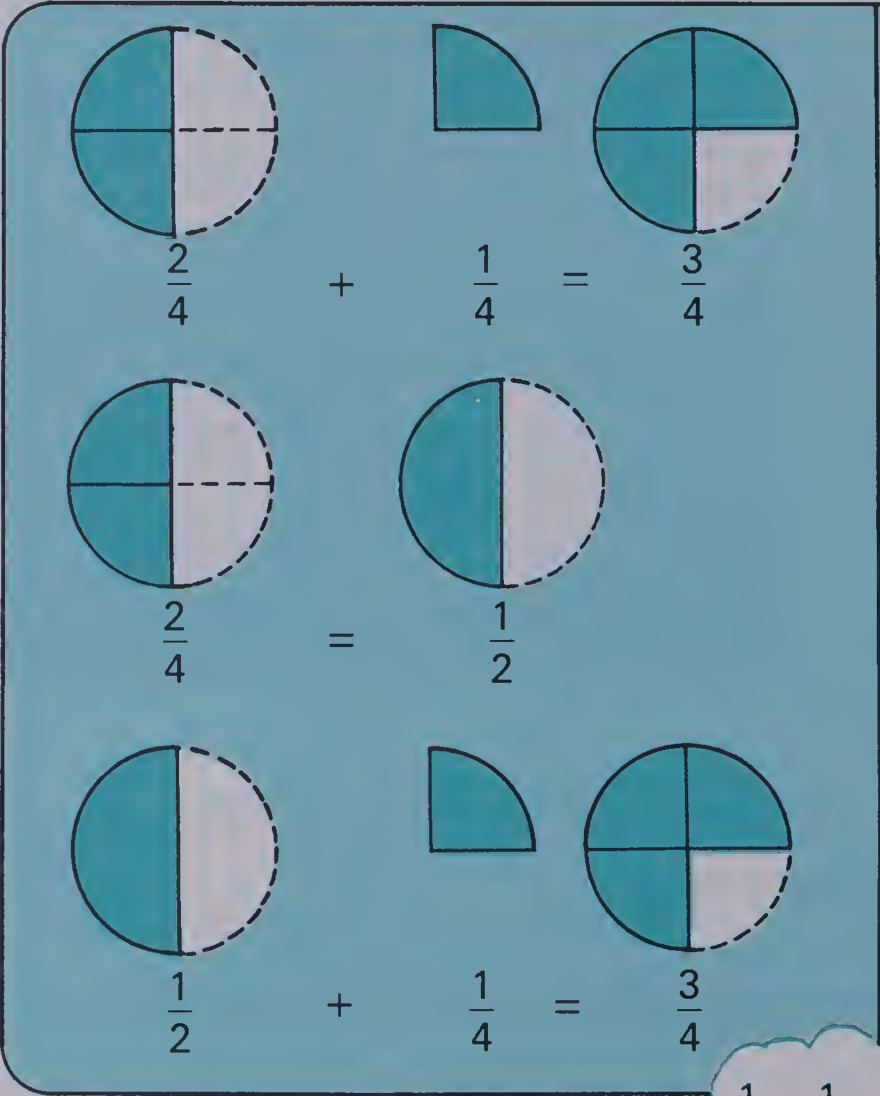

330 km
Area is 6600 km²
? km

FRACTIONS/ Using Equivalent Fractions / Addition

$$\frac{2}{4}+\frac{1}{4}=\frac{3}{4} \qquad \frac{1}{2}+\frac{1}{4}=\frac{3}{4}$$

Why are the 2 sums the same?

a) Using fractional pies

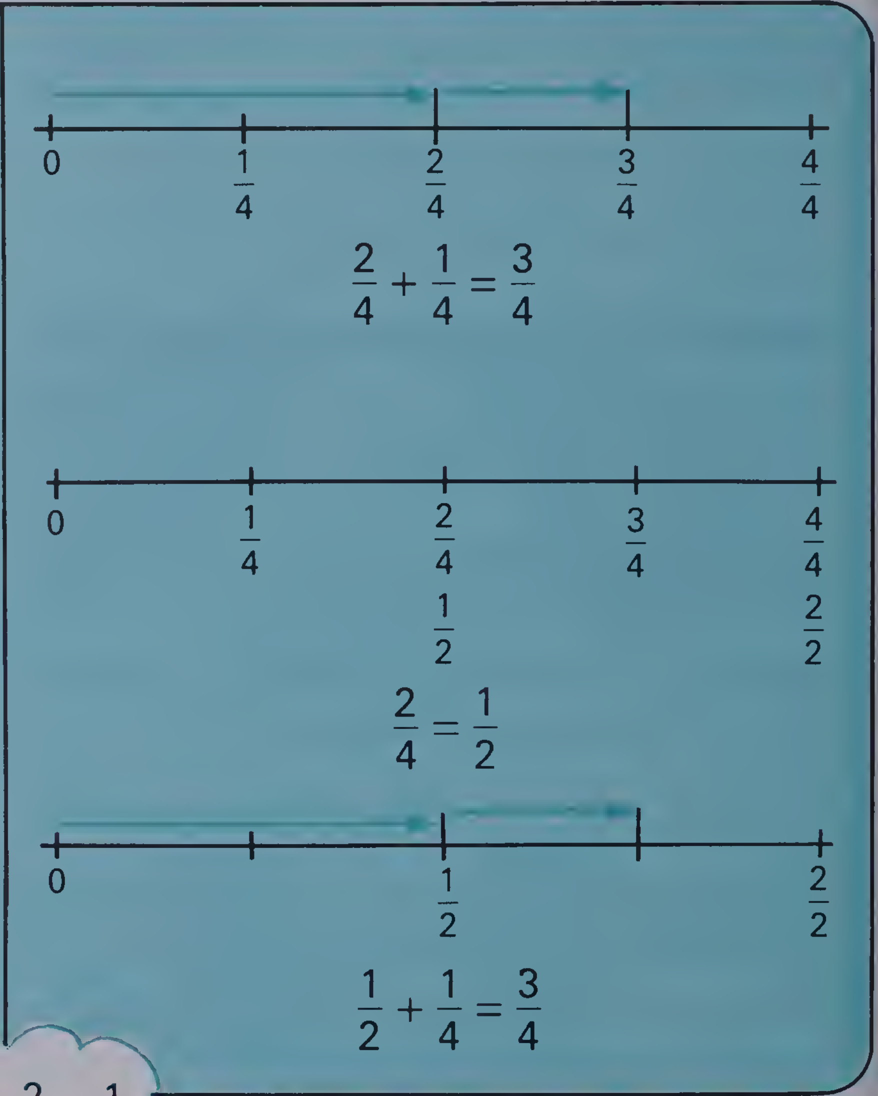


$\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$

$\frac{2}{4}=\frac{1}{2}$

$\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$

b) Using number lines


0
1/4
2/4
3/4
4/4
0
1/4
2/4
1/2
3/4
4/4
2/2
0
1/2
2/2

$\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$

$\frac{2}{4}=\frac{1}{2}$

$\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$

$$\frac{1}{2}+\frac{1}{4}=\frac{2}{4}+\frac{1}{4}$$
$$=\frac{3}{4}$$

1. Why is $\frac{1}{5}+\frac{2}{5}$ the same as $\frac{1}{5}+\frac{4}{10}$? Illustrate.
2. Why is $\frac{3}{10}+\frac{3}{5}$ the same as $\frac{3}{10}+\frac{6}{10}$? Illustrate.

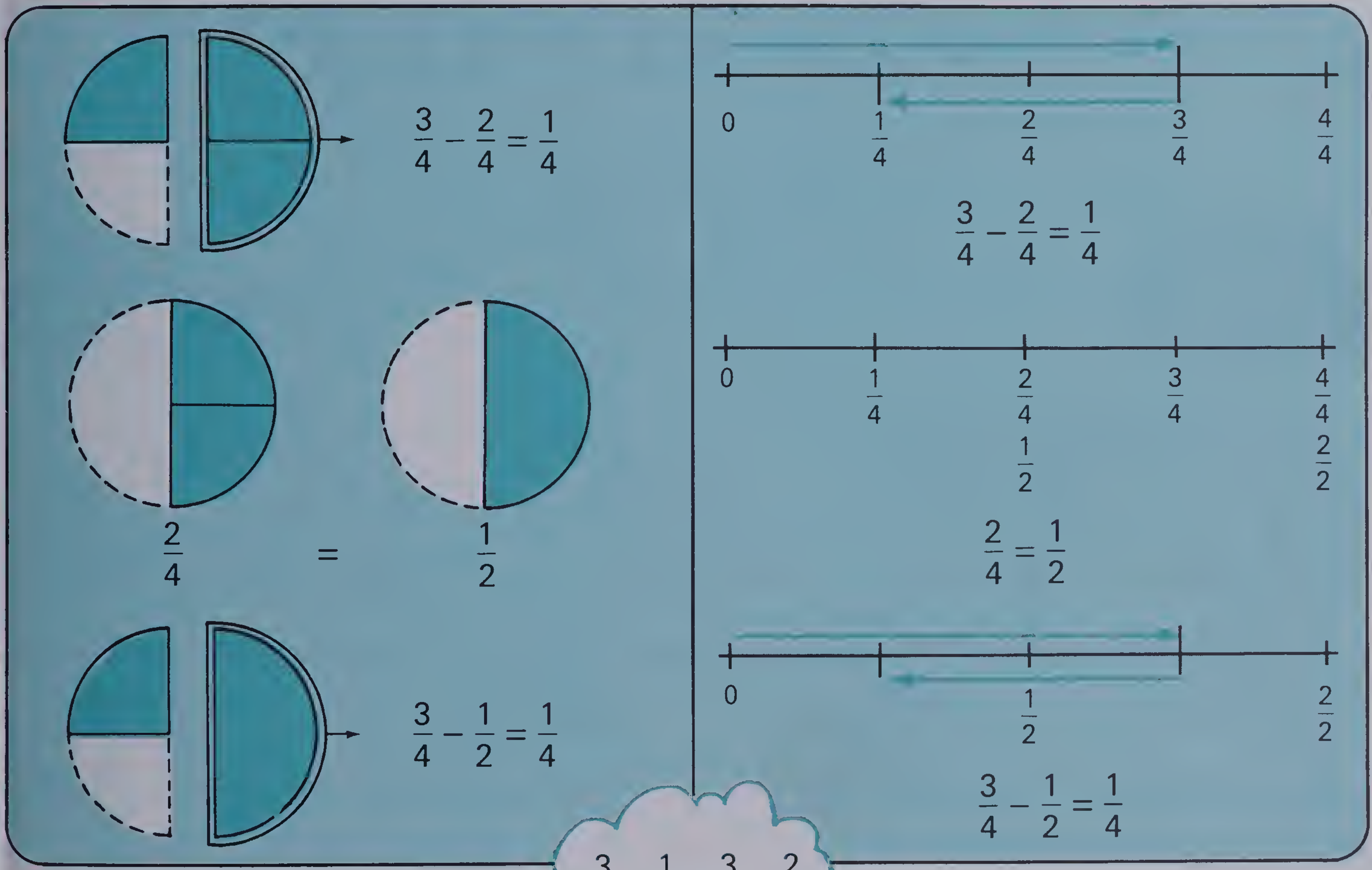
Using Equivalent Fractions / Subtraction

$$\frac{3}{4}-\frac{2}{4}=\frac{1}{4} \qquad \frac{3}{4}-\frac{1}{2}=\frac{1}{4}$$

Why are the 2 differences the same?

a) Using fractional pies

b) Using number lines


$\frac{3}{4}-\frac{2}{4}=\frac{1}{4}$
$\frac{2}{4}$ = $\frac{1}{2}$
$\frac{3}{4}-\frac{1}{2}=\frac{1}{4}$
0
$\frac{1}{4}$
$\frac{2}{4}$
$\frac{3}{4}$
$\frac{4}{4}$
$\frac{3}{4}-\frac{2}{4}=\frac{1}{4}$
0
$\frac{1}{4}$
$\frac{2}{4}$
$\frac{1}{2}$
$\frac{3}{4}$
$\frac{4}{4}$
$\frac{2}{2}$
$\frac{2}{4}=\frac{1}{2}$
0
$\frac{1}{2}$
$\frac{2}{2}$
$\frac{3}{4}-\frac{1}{2}=\frac{1}{4}$

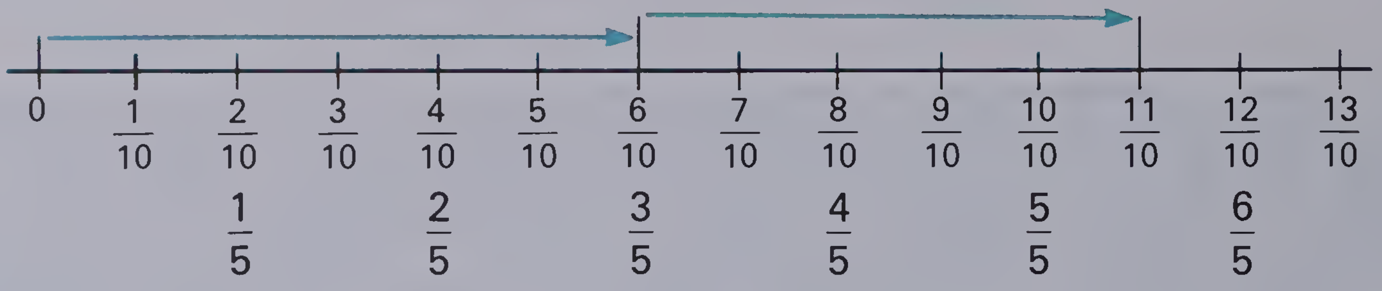
$$\frac{3}{4}-\frac{1}{2}=\frac{3}{4}-\frac{2}{4}$$
$$=\frac{1}{4}$$

IN ACTION

1. Why is $\frac{9}{10}-\frac{1}{5}$ the same as $\frac{9}{10}-\frac{2}{10}$? Illustrate. 2. Why is $\frac{7}{10}-\frac{1}{2}$ the same as $\frac{7}{10}-\frac{5}{10}$? Illustrate.

Adding Fractions / Unlike Denominators

$\frac{3}{5} + \frac{5}{10} = ?$


0
$\frac{1}{10}$
$\frac{2}{10}$
$\frac{3}{10}$
$\frac{4}{10}$
$\frac{5}{10}$
$\frac{6}{10}$
$\frac{7}{10}$
$\frac{8}{10}$
$\frac{9}{10}$
$\frac{10}{10}$
$\frac{11}{10}$
$\frac{12}{10}$
$\frac{13}{10}$
$\frac{1}{5}$
$\frac{2}{5}$
$\frac{3}{5}$
$\frac{4}{5}$
$\frac{5}{5}$
$\frac{6}{5}$

$$\frac{3}{5} + \frac{5}{10} = \frac{6}{10} + \frac{5}{10}$$
$$= \frac{11}{10}$$

1. Write the equivalent fractions.

a) $\frac{1}{2} = \frac{?}{4}$ b) $\frac{?}{2} = \frac{8}{4}$ c) $\frac{3}{5} = \frac{?}{10}$ d) $\frac{?}{5} = \frac{4}{10}$ e) $\frac{3}{2} = \frac{?}{4}$

f) $\frac{?}{2} = \frac{5}{10}$ g) $\frac{7}{5} = \frac{?}{10}$ h) $\frac{2}{?} = \frac{4}{4}$ i) $\frac{8}{10} = \frac{4}{?}$ j) $\frac{?}{5} = \frac{20}{10}$

2. Complete. Use a number line for each question.

a) $\frac{1}{2} + \frac{2}{4} = ?$ b) $\frac{3}{4} + \frac{1}{2} = ?$ c) $\frac{3}{5} + \frac{1}{10} = ?$ d) $\frac{3}{10} + \frac{1}{5} = ?$

e) $\frac{3}{2} + ? = \frac{7}{4}$ f) $? + \frac{2}{2} = \frac{5}{4}$ g) $\frac{2}{5} + ? = \frac{7}{10}$ h) $? + \frac{3}{5} = \frac{12}{10}$

3. Complete.

a) $\frac{1}{4} + \frac{1}{2} = ?$ b) $\frac{1}{5} + \frac{7}{10} = ?$ c) $\frac{1}{2} + ? = \frac{8}{4}$ d) $\frac{3}{5} + ? = \frac{15}{10}$

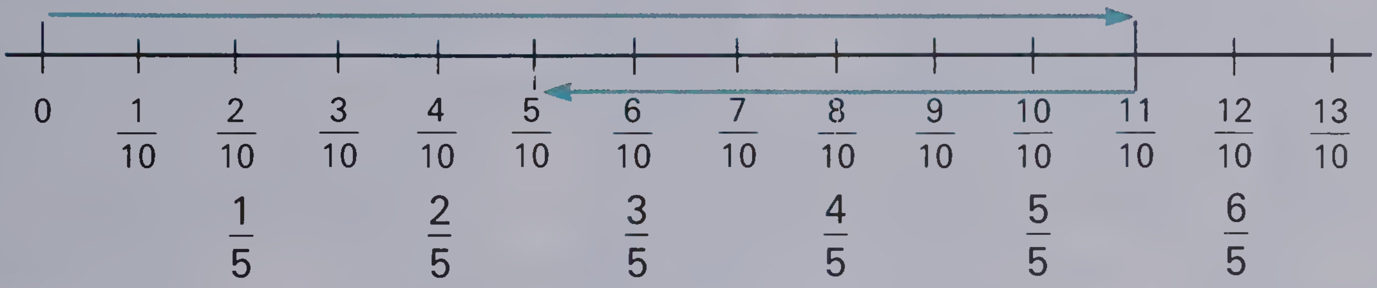
e) $? + \frac{1}{2} = \frac{7}{4}$ f) $? + \frac{1}{5} = \frac{4}{10}$ g) $\frac{2}{2} + \frac{3}{4} = ?$ h) $\frac{2}{5} + \frac{2}{10} = ?$

4. Which is greater?

a) $\frac{1}{2} + \frac{3}{10}$ or $\frac{2}{10} + \frac{1}{5}$ b) $\frac{3}{4} + \frac{3}{2}$ or $\frac{10}{5} + \frac{1}{10}$ c) $\frac{4}{5} + \frac{1}{2}$ or $\frac{1}{2} + \frac{9}{10}$

Subtracting Fractions/Unlike Denominators

$\frac{11}{10} - \frac{3}{5} = ?$



0
$\frac{1}{10}$
$\frac{2}{10}$
$\frac{3}{10}$
$\frac{4}{10}$
$\frac{5}{10}$
$\frac{6}{10}$
$\frac{7}{10}$
$\frac{8}{10}$
$\frac{9}{10}$
$\frac{10}{10}$
$\frac{11}{10}$
$\frac{12}{10}$
$\frac{13}{10}$
$\frac{1}{5}$
$\frac{2}{5}$
$\frac{3}{5}$
$\frac{4}{5}$
$\frac{5}{5}$
$\frac{6}{5}$

$$\frac{11}{10} - \frac{3}{5} = \frac{11}{10} - \frac{6}{10}$$
$$= \frac{5}{10}$$

IN ACTION

1. Write the equivalent fractions.

a) $\frac{1}{2} = \frac{2}{?}$ b) $\frac{?}{10} = \frac{1}{2}$ c) $\frac{3}{2} = \frac{?}{4}$ d) $\frac{1}{?} = \frac{2}{10}$ e) $\frac{2}{2} = \frac{4}{?}$

f) $\frac{4}{10} = \frac{?}{5}$ g) $\frac{?}{4} = \frac{1}{2}$ h) $\frac{18}{?} = \frac{9}{5}$ i) $\frac{3}{2} = \frac{6}{?}$ j) $\frac{7}{5} = \frac{?}{10}$

2. Complete. Use a number line for each question.

a) $\frac{11}{10} - \frac{2}{5} = ?$ b) $\frac{4}{4} - \frac{1}{2} = ?$ c) $\frac{3}{5} - \frac{3}{10} = ?$ d) $\frac{3}{2} - \frac{3}{4} = ?$

e) $\frac{7}{10} - ? = \frac{1}{2}$ f) $\frac{5}{4} - ? = \frac{1}{2}$ g) $? - \frac{6}{5} = \frac{1}{10}$ h) $? - \frac{3}{4} = \frac{3}{2}$

3. Complete.

a) $\frac{15}{10} - \frac{3}{5} = ?$ b) $\frac{5}{4} - \frac{1}{2} = ?$ c) $\frac{6}{5} - ? = \frac{3}{10}$ d) $\frac{2}{2} - ? = \frac{3}{10}$

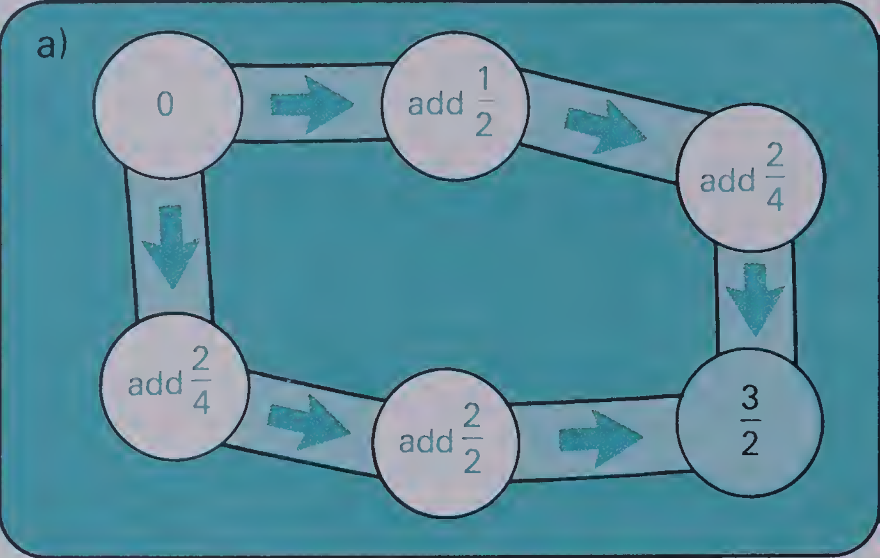
e) $? - \frac{1}{2} = \frac{1}{10}$ f) $? - \frac{1}{2} = \frac{5}{4}$ g) $\frac{13}{10} - ? = \frac{4}{10}$ h) $\frac{3}{4} - \frac{5}{10} = ?$

4. Which is less?

a) $\frac{3}{5} - \frac{3}{10}$ or $\frac{9}{10} - \frac{1}{2}$ b) $\frac{3}{2} - \frac{3}{4}$ or $\frac{6}{5} - \frac{2}{10}$ c) $\frac{5}{5} - \frac{1}{2}$ or $\frac{2}{10} + \frac{2}{5}$

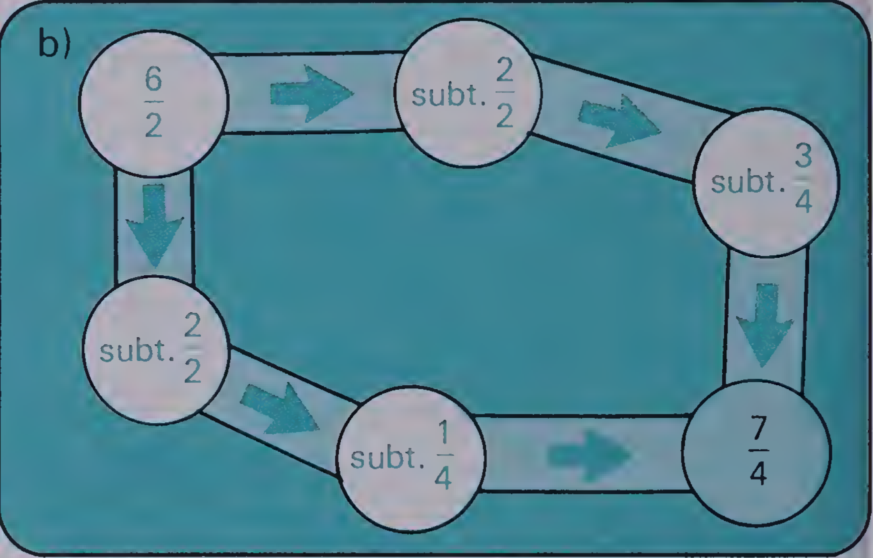
5. Which path should you take?

a)



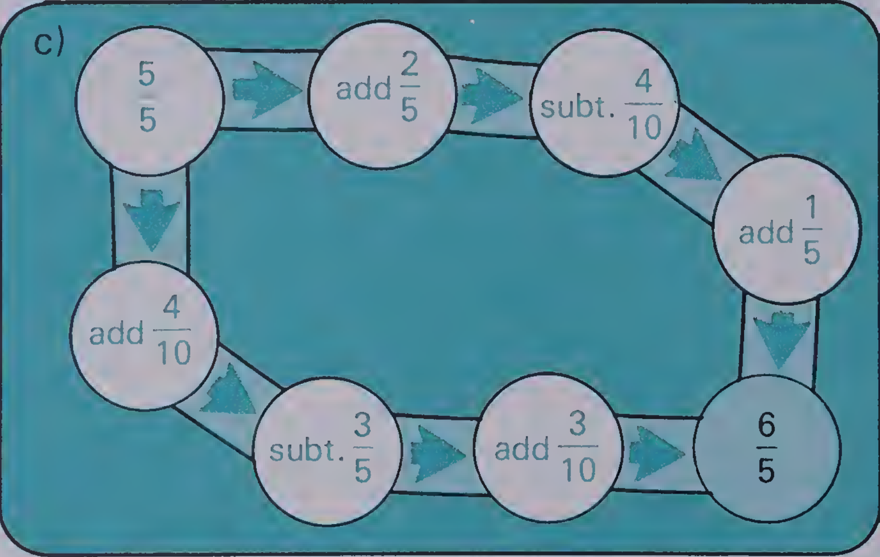
0
add $\frac{1}{2}$
add $\frac{2}{4}$
add $\frac{2}{4}$
add $\frac{2}{2}$
$\frac{3}{2}$

b)



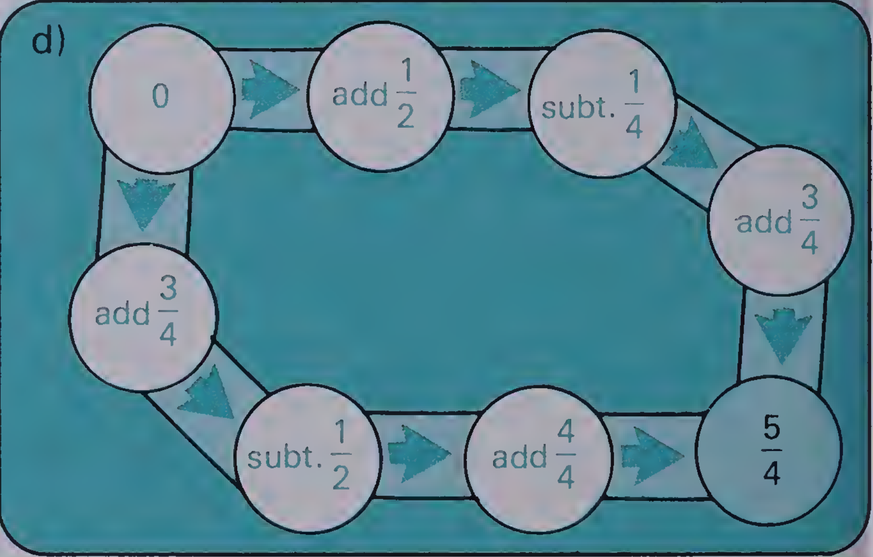
$\frac{6}{2}$
subt. $\frac{2}{2}$
subt. $\frac{3}{4}$
subt. $\frac{2}{2}$
subt. $\frac{1}{4}$
$\frac{7}{4}$

c)



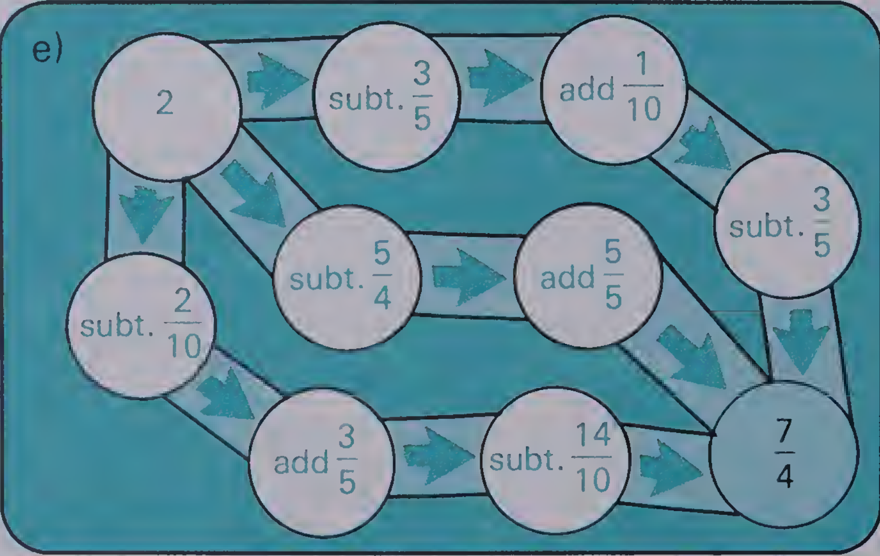
$\frac{5}{5}$
add $\frac{2}{5}$
subt. $\frac{4}{10}$
add $\frac{1}{5}$
add $\frac{4}{10}$
subt. $\frac{3}{5}$
add $\frac{3}{10}$
$\frac{6}{5}$

d)



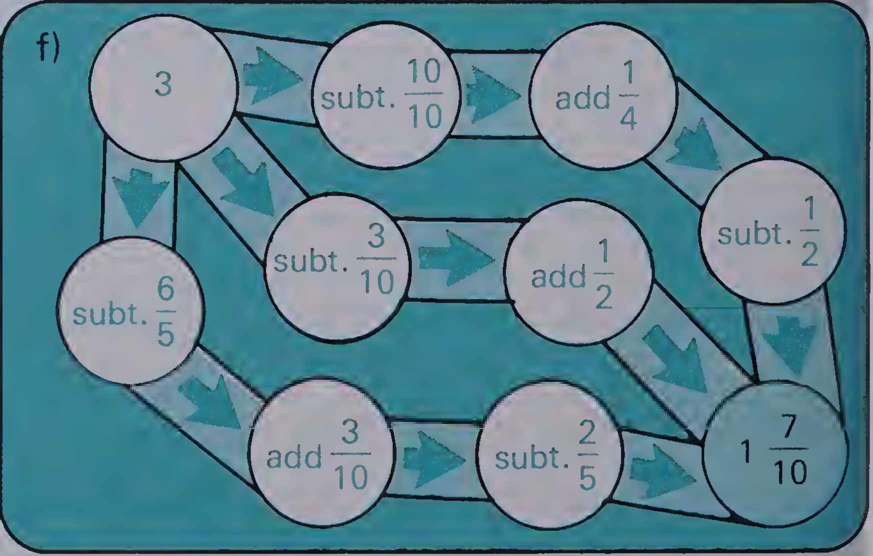
0
add $\frac{1}{2}$
subt. $\frac{1}{4}$
add $\frac{3}{4}$
add $\frac{3}{4}$
subt. $\frac{1}{2}$
add $\frac{4}{4}$
$\frac{5}{4}$

e)

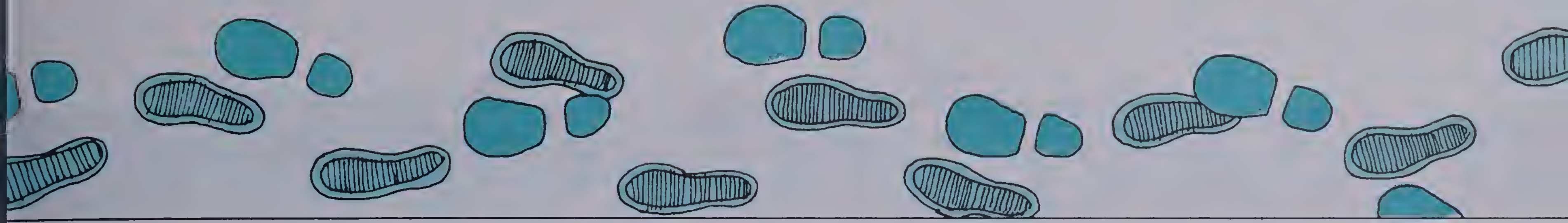


2
subt. $\frac{3}{5}$
add $\frac{1}{10}$
subt. $\frac{3}{5}$
subt. $\frac{5}{4}$
add $\frac{5}{5}$
subt. $\frac{2}{10}$
add $\frac{3}{5}$
subt. $\frac{14}{10}$
$\frac{7}{4}$

f)

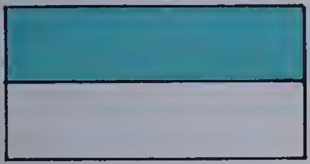


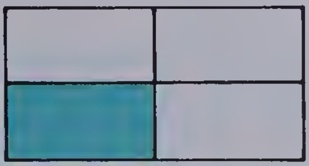
3
subt. $\frac{10}{10}$
add $\frac{1}{4}$
subt. $\frac{1}{2}$
subt. $\frac{3}{10}$
add $\frac{1}{2}$
subt. $\frac{6}{5}$
add $\frac{3}{10}$
subt. $\frac{2}{5}$
$1\frac{7}{10}$

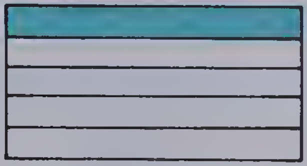


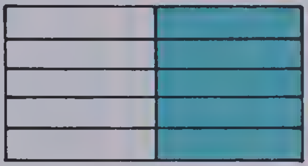
Retrace Your Steps

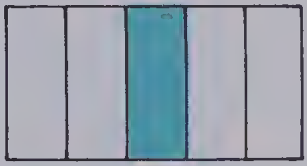
1. What fractional part is coloured?

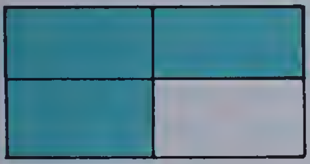
a) 

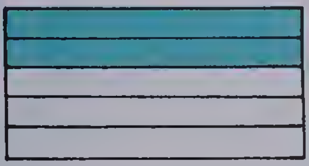
b) 

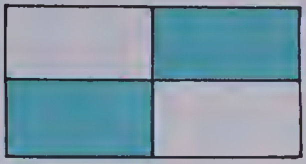
c) 

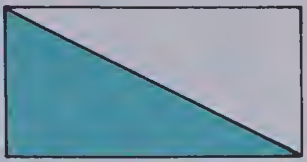
d) 

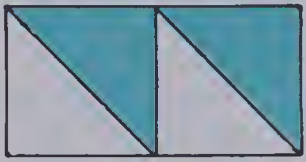
e) 

f) 

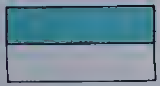
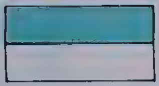
g) 

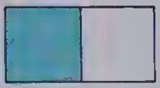
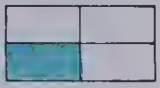
h) 

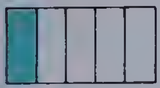
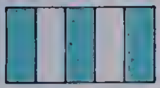
i) 

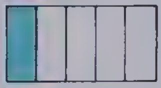
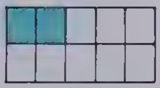
j) 

2. Write an addition question for the shaded parts of the diagrams.

a)  +  = ?

b)  +  = ?

c)  +  = ?

d)  +  = ?

3. Write the following using = or < or > .

a) $\frac{1}{4} + \frac{1}{4} \ ? \ \frac{1}{2}$
b) $\frac{1}{2} \ ? \ \frac{2}{4} + \frac{1}{4}$
c) $\frac{1}{5} + \frac{2}{5} \ ? \ \frac{4}{5}$
d) $\frac{3}{5} \ ? \ \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$
e) $\frac{1}{10} + \frac{2}{10} \ ? \ \frac{3}{10}$
f) $\frac{2}{10} + \frac{3}{10} \ ? \ \frac{5}{10}$
g) $\frac{4}{10} + \frac{5}{10} \ ? \ \frac{8}{10}$
h) $\frac{4}{5} \ ? \ \frac{3}{5} + \frac{1}{5}$

4. Complete.

a) $\frac{1}{2} = \frac{?}{4}$
b) $\frac{2}{5} = \frac{?}{10}$
c) $\frac{?}{5} = \frac{6}{10}$
d) $\frac{1}{4} + \frac{1}{4} = \frac{?}{4}$
e) $\frac{1}{2} + \frac{1}{4} = \frac{?}{4}$
f) $\frac{1}{5} + \frac{?}{5} = \frac{3}{5}$
g) $\frac{?}{5} + \frac{2}{5} = \frac{3}{5}$
h) $\frac{3}{10} + \frac{?}{10} = \frac{7}{10}$
i) $\frac{2}{5} + \frac{?}{10} = \frac{7}{10}$
j) $\frac{3}{5} + \frac{4}{10} = \frac{?}{10}$

5. 4 people and 1 pizza. How much of the pizza will each person receive if it is cut into equal pieces?

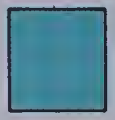
6. On Monday, Theresa read $\frac{1}{5}$ of the book. On Tuesday she read $\frac{3}{10}$. What fraction of the book does Theresa still have to read?

7. $\frac{1}{5}$ of the class has blonde hair. $\frac{1}{10}$ has red hair. What fraction of the class has neither blonde nor red hair?

EXPLORE

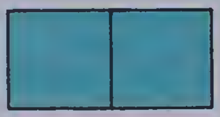
AREA/Counting Square Centimetres (cm^2)

We measure the surface of shapes
by counting the number of square units.



1 cm^2

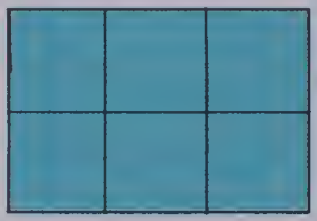
This square shape has an
area of 1 cm^2 (one square centimetre).

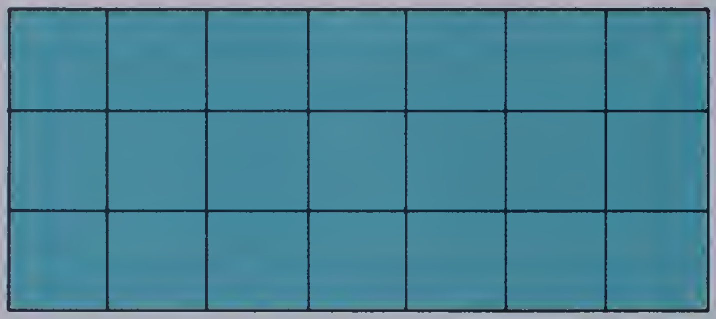


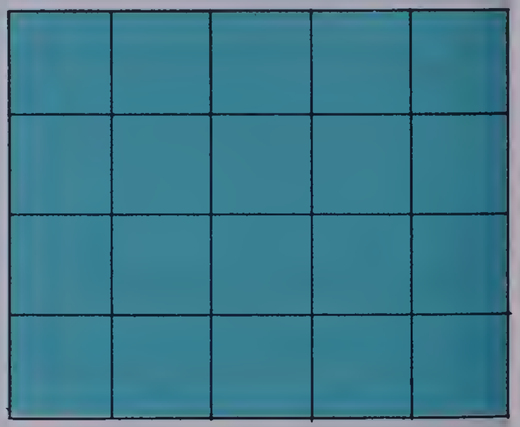
2 cm^2

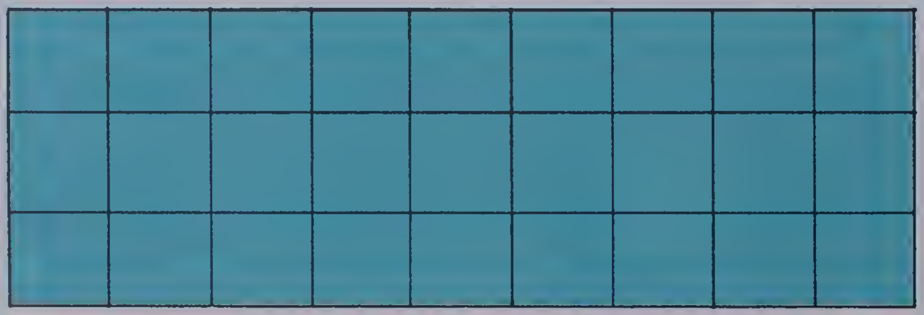
This rectangular shape
has an area of 2 cm^2.

What is the area of each rectangular shape?





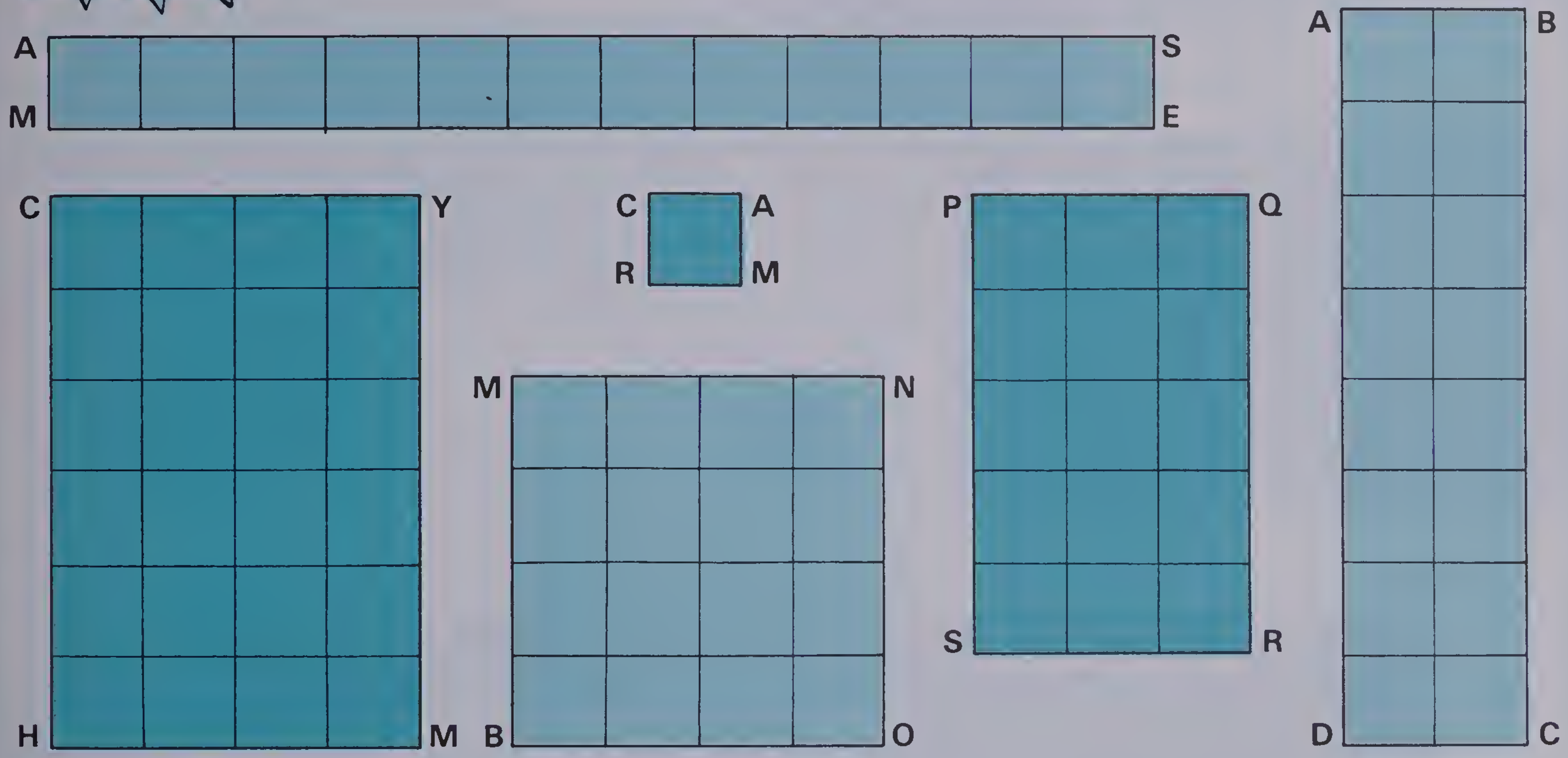




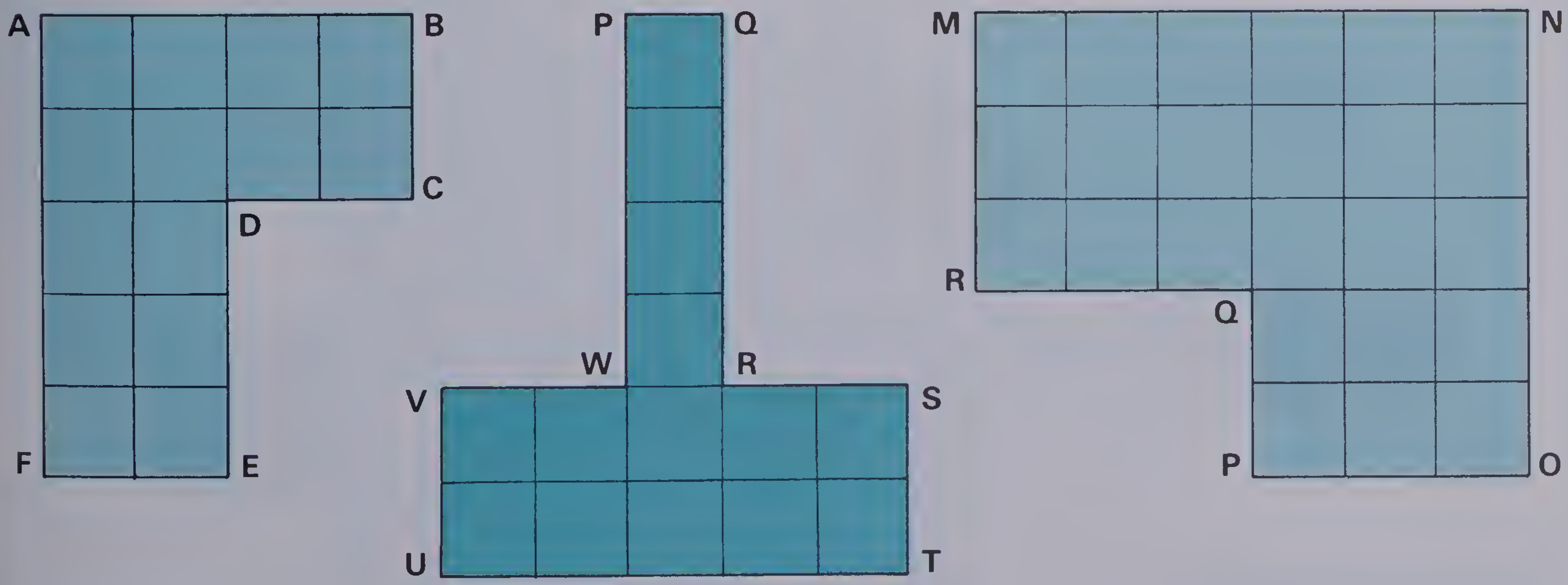
Draw a rectangle with an area of 16 cm^2.
Draw a different rectangle with an area of 16 cm^2.
What is the perimeter of each rectangle?

IN ACTION

1. What is the area of each rectangular shape?

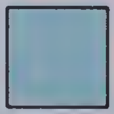

A
S
M
E
A
B
C
Y
C
A
R
M
P
Q
M
N
S
R
H
M
B
O
D
C

2. Find the area of each of these shapes.

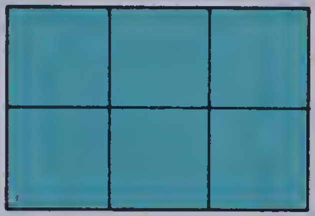

A
B
P
Q
M
N
C
D
R
Q
W
R
V
S
F
E
P
O
U
T

3. What is the perimeter of each shape in Question 2?

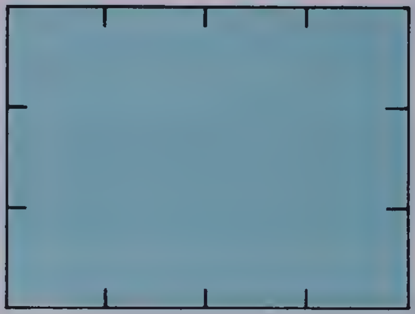
Calculating Area/Square Centimetres (cm²)



1 cm^2



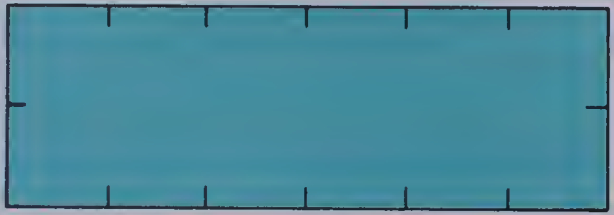
Area = $(3 \times 2)\ \text{cm}^2$
= $6\ \text{cm}^2$



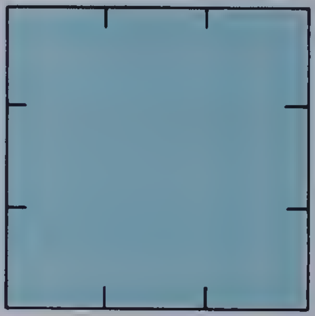
Area = $(4 \times 3)\ \text{cm}^2$
= $12\ \text{cm}^2$

IN ACTION

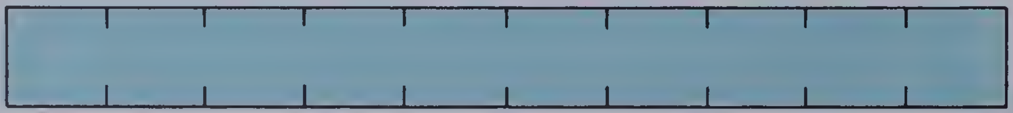
1. Complete.



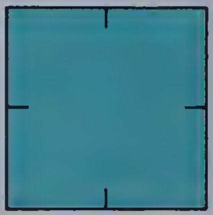
a) Area = $(6 \times 2)\ \text{cm}^2$
= ? cm^2



b) Area = $(3 \times 3)\ \text{cm}^2$
= ? cm^2



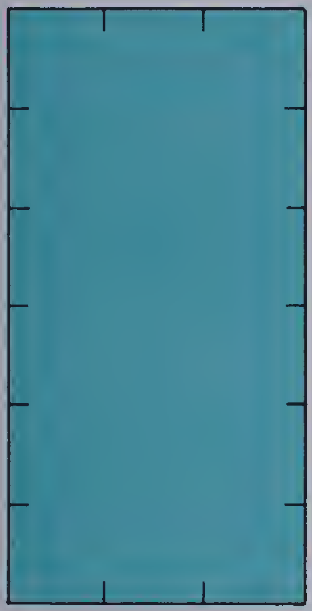
c) Area = $(10 \times\ ?\ )\ \text{cm}^2$
= ?



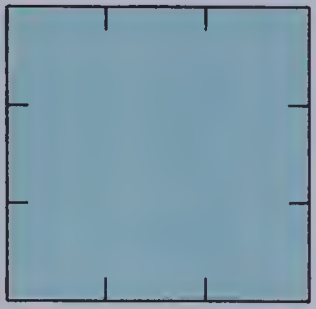
d) Area = (? × ?) ?
= ?

2. Estimate, then find the area of each shape.

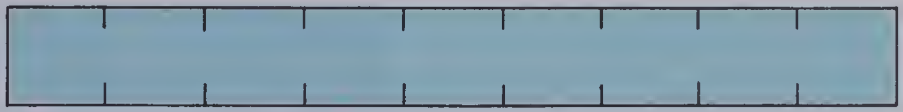
a)



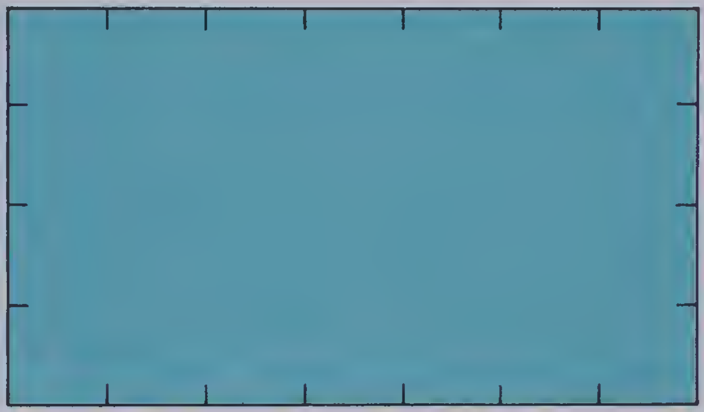
b)



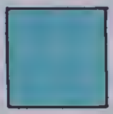
c)



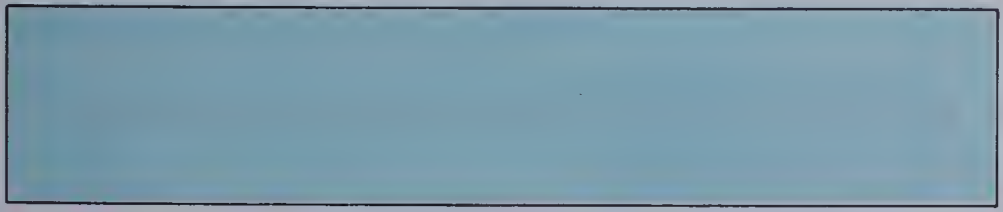
d)



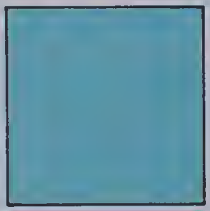
e)



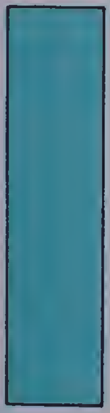
f)



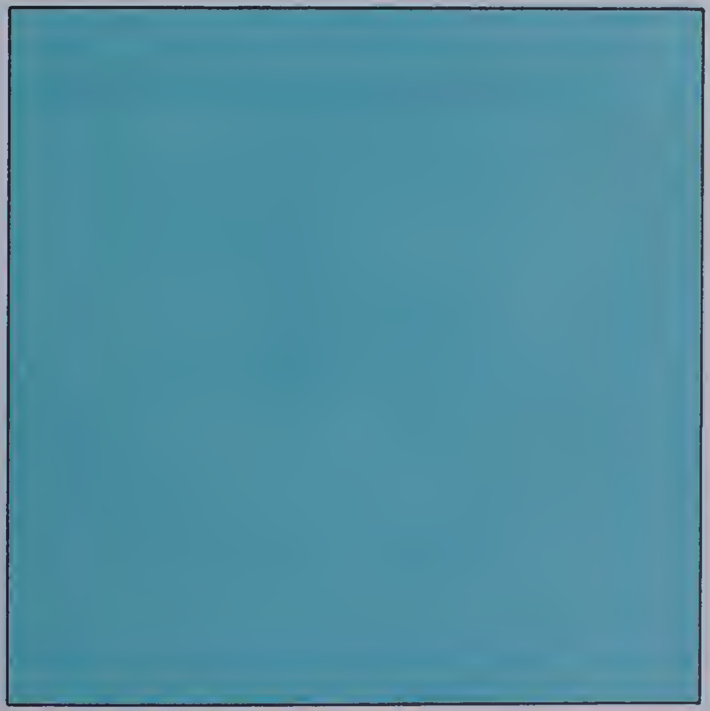
g)



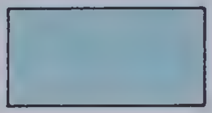
h)



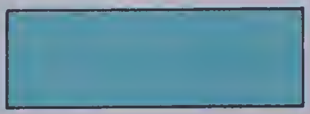
i)



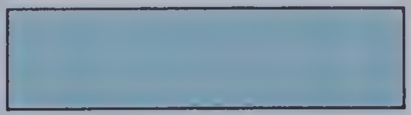
j)



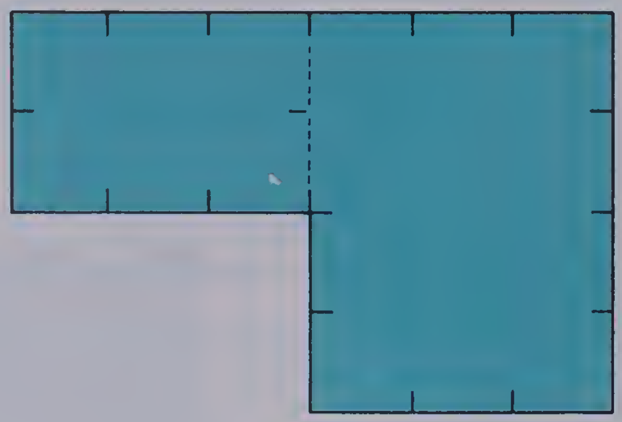
k)



l)



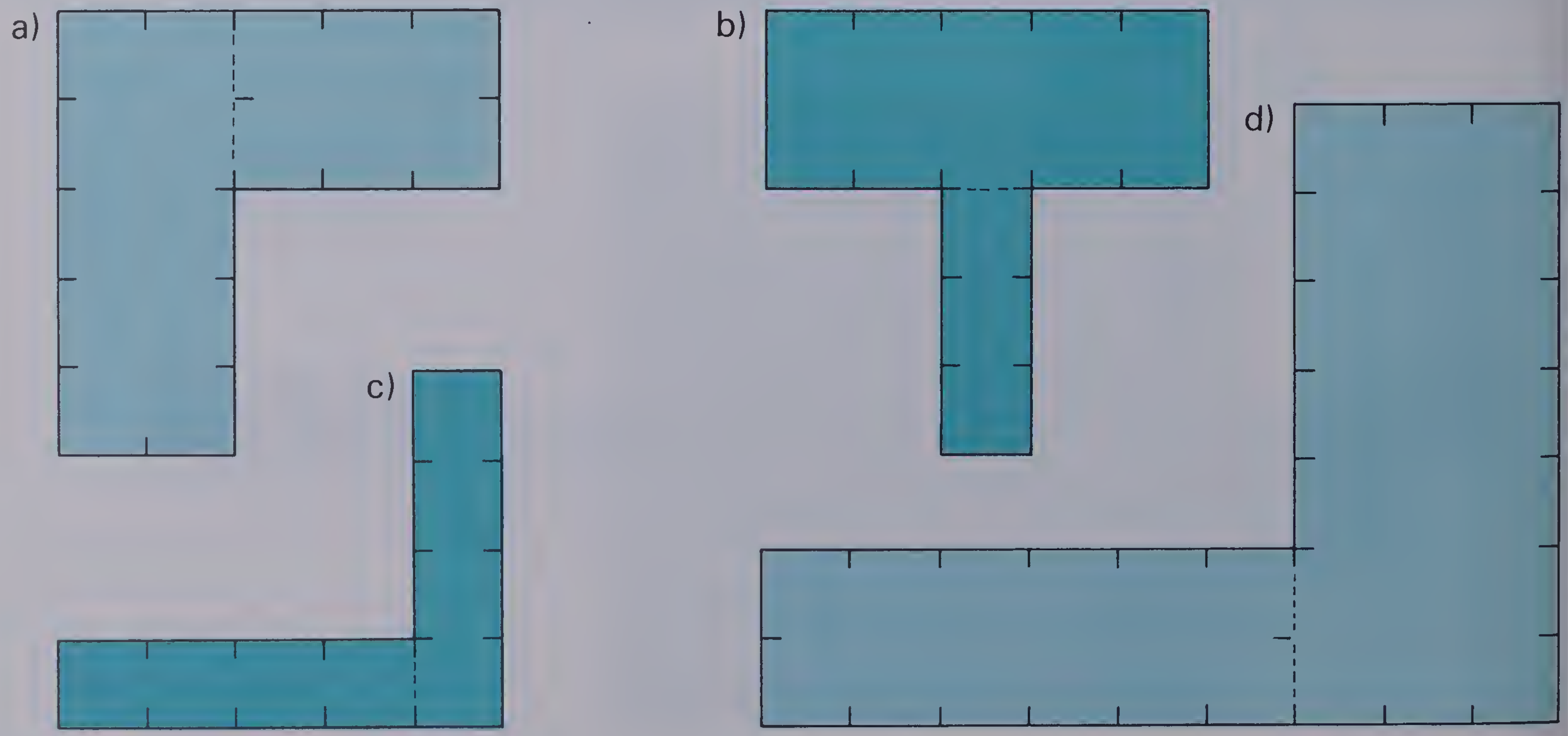
Calculating Area/Square Centimetres (cm²)



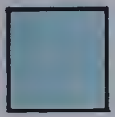
$$\begin{aligned}\text{Area} &= (3 \times 2)\ \text{cm}^2 + (3 \times 4)\ \text{cm}^2\\ &= 6\ \text{cm}^2 + 12\ \text{cm}^2\\ &= 18\ \text{cm}^2\end{aligned}$$

IN ACTION

Estimate, then find the area of each shape in square centimetres.

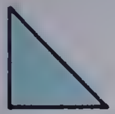


Half-Squares



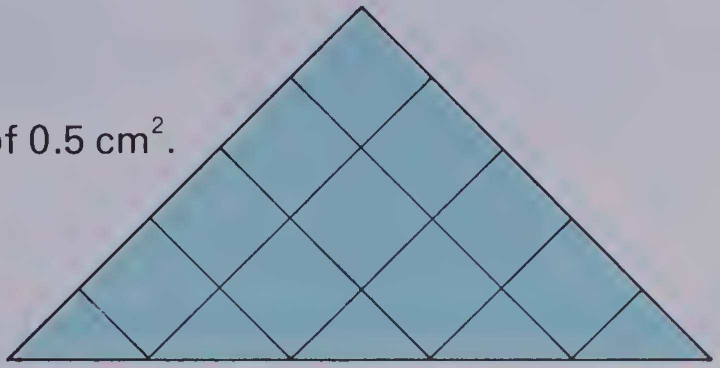
This square has an area of 1 cm^2.

1 cm^2



This shape has an area of 0.5 cm^2.

0.5 cm^2

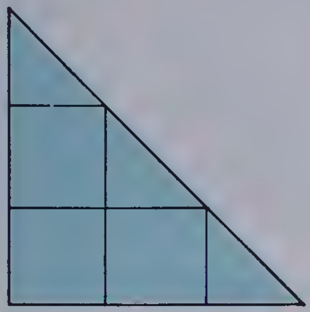


Find the area of this shape.
Count squares and half-squares.
Area = 12.5 cm^2

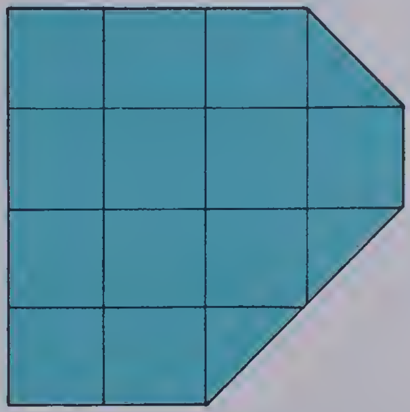
IN ACTION

Estimate, then find the area of each shape.

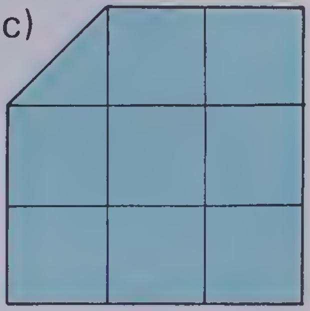
a)



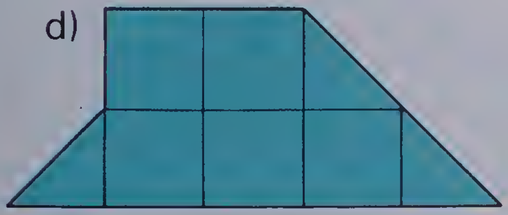
b)



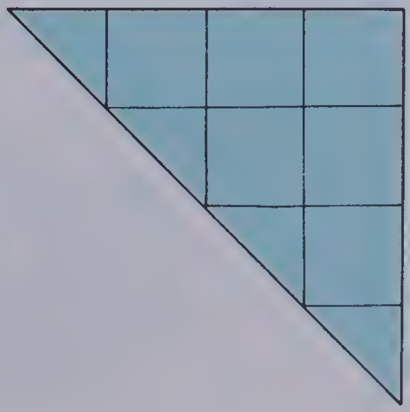
c)



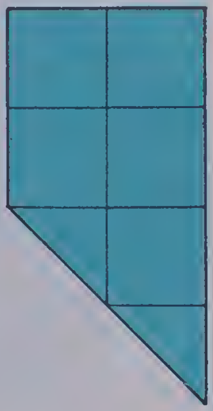
d)



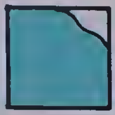
e)



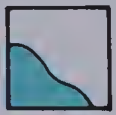
f)



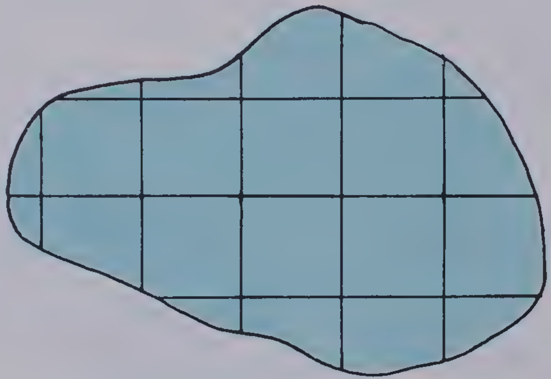
Irregular Shapes



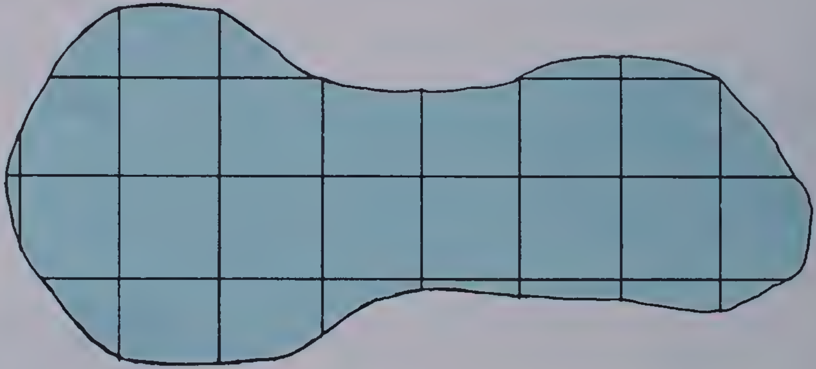
If the area of the shaded part is greater than 0.5 cm^2, count 1 cm^2



If the area of the shaded part is less than 0.5 cm^2, count 0 cm^2



Area is about 13 cm^2

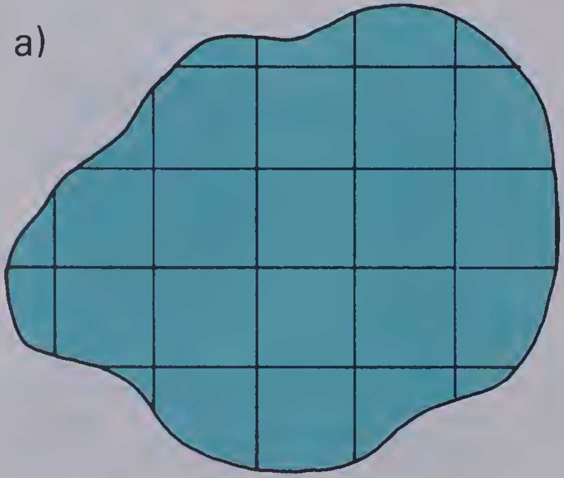


Use that method to find the area of this shape.

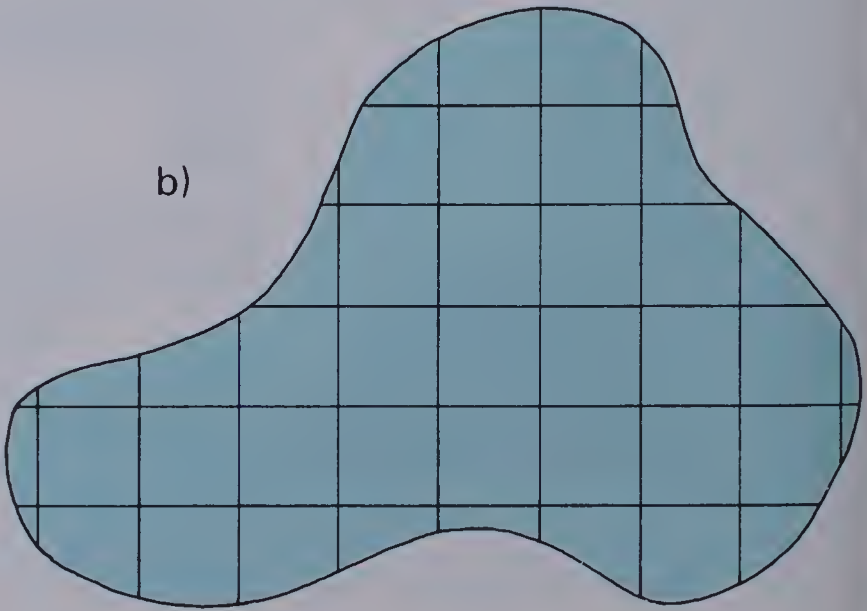
IN ACTION

1. Estimate, then find the approximate area of each shape.

a)

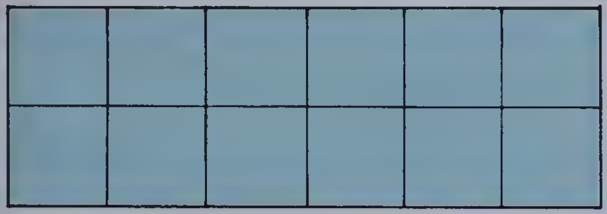


b)

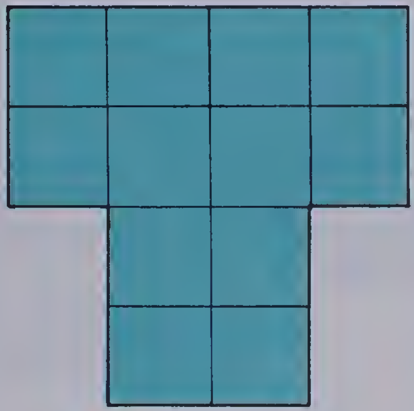


2. Estimate, then find the area of each shape.

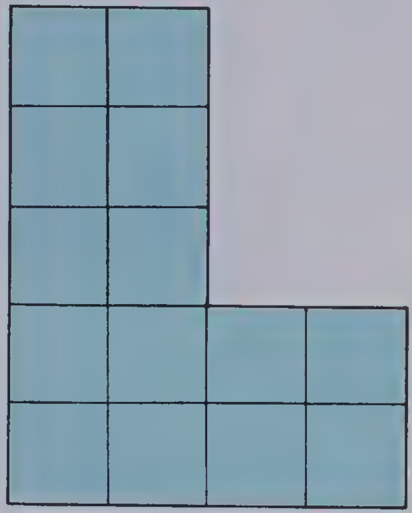
a)



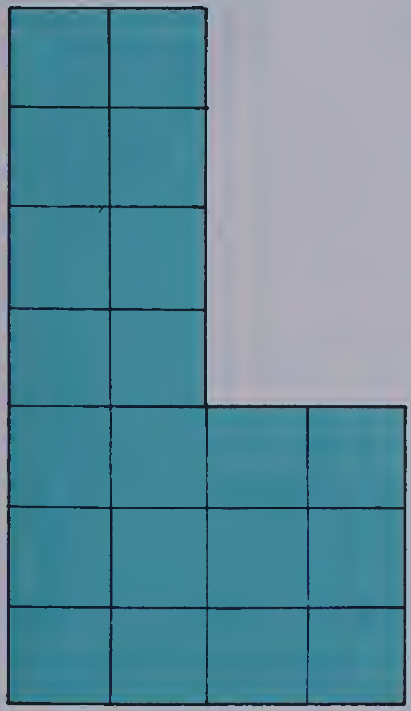
b)



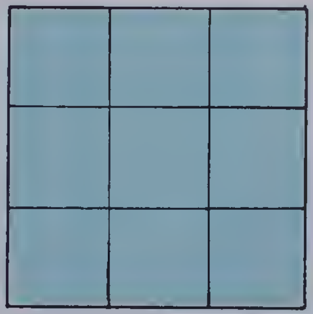
c)



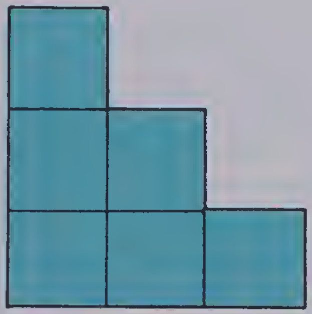
d)



e)



f)



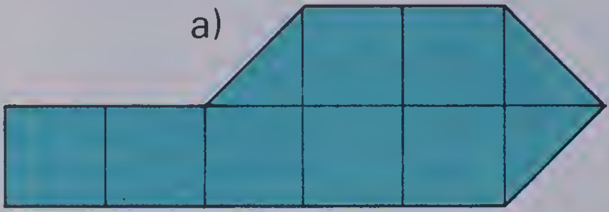
3. On 1 cm graph paper, draw shapes that have these areas.
   a) 13 cm^2 b) 17 cm^2 c) 20 cm^2 d) 29 cm^2

4. Draw several different shapes with an area of 8 cm^2.

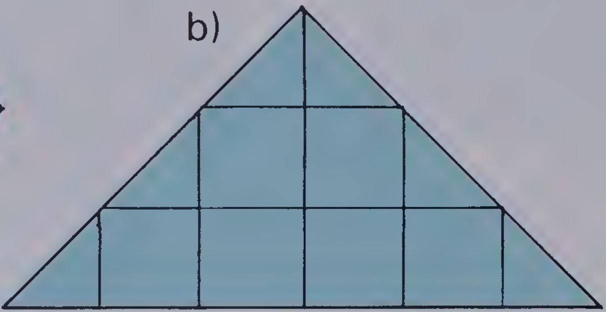
5. a) Draw a shape with a perimeter of 20 cm. What is the area of the shape?
   b) Draw a different shape with a perimeter of 20 cm.
   What is the area of this shape?

6. Find the area of each shape in square centimetres.

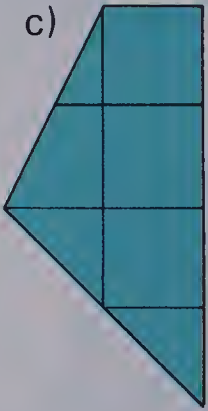
a)



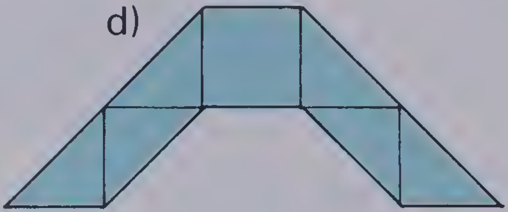
b)



c)

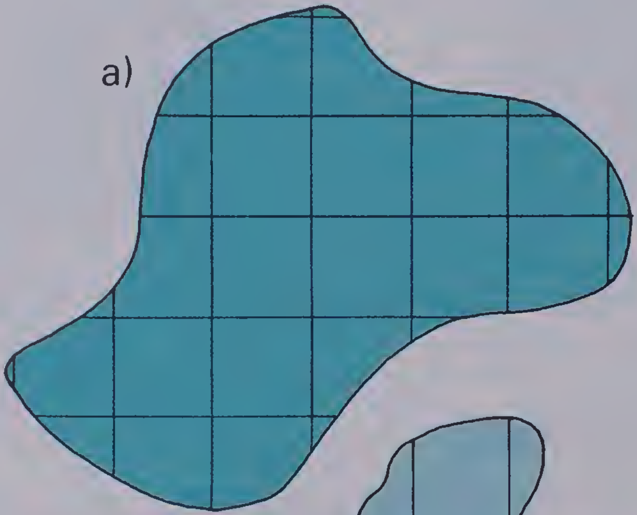


d)

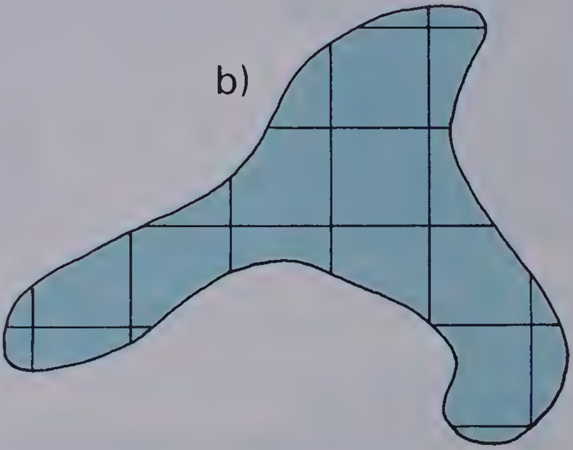


7. Find the approximate area of each shape.

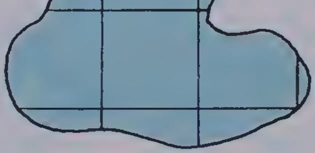
a)



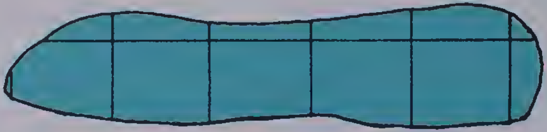
b)



c)



d)

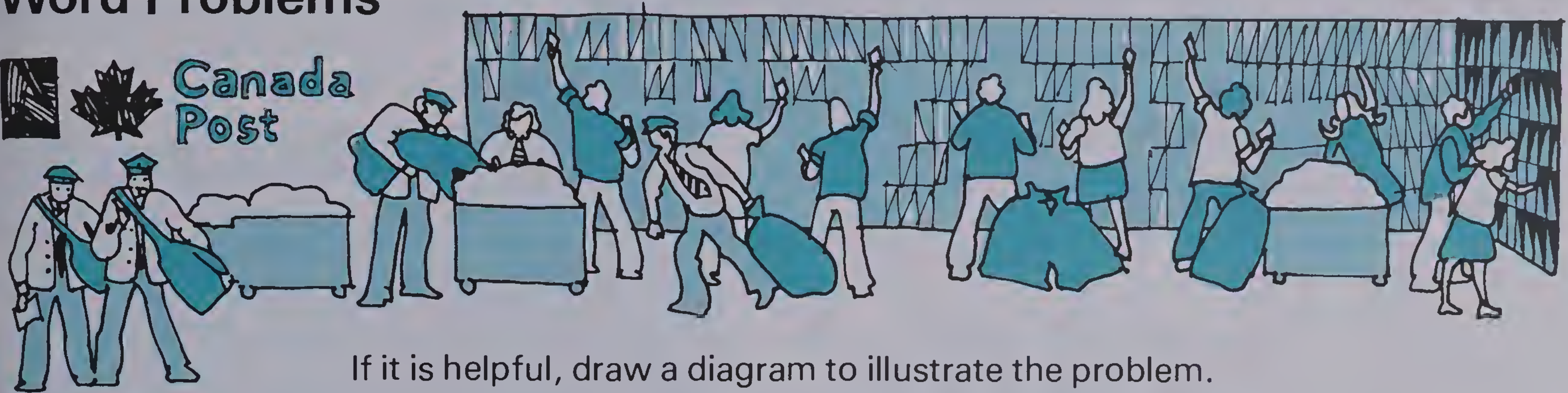


8. On 1 cm graph paper, draw shapes that have these areas.
a) 16.5 cm^2 b) 19 cm^2 c) 3.5 cm^2 d) 5.5 cm^2

9. Draw several different shapes, each having an area of 8.5 cm^2.

Word Problems

Canada Post



If it is helpful, draw a diagram to illustrate the problem.

1. The maximum length and width of a postcard is 148 mm by 105 mm. What is the perimeter of the card?

3. The minimum thickness for a Business Reply Card is 0.18 mm. What is the thickness of a) 10 cards b) 100 cards c) 1000 cards d) 50 cards e) 250 cards?

5. The maximum length and width of an envelope for international service is 235 mm by 120 mm. The minimum length and width is 140 mm by 90 mm. a) What is the difference in length of the 2 envelopes? b) What is the difference in width of the 2 envelopes?

7. An office received 2000 letters, each measuring 5 mm thick. Express the total thickness of all the letters in a) millimetres b) centimetres c) metres.

9. The minimum length and width of a postcard is 140 mm by 90 mm. What is the perimeter of the card?

2. Mail marked with a postal code will be sorted mechanically at speeds of at least 23 500 letters per hour. How many letters can be sorted a) in 8 h b) by 10 machines in 1 h?

4. The maximum allowable thickness of an envelope is 5 mm. How many letters of maximum thickness would it take to measure a) 100 mm b) 1 cm?

6. Standard letter-size envelopes must be rectangular in shape. One envelope has a length of 150 mm and a perimeter of 500 mm. What is its width?

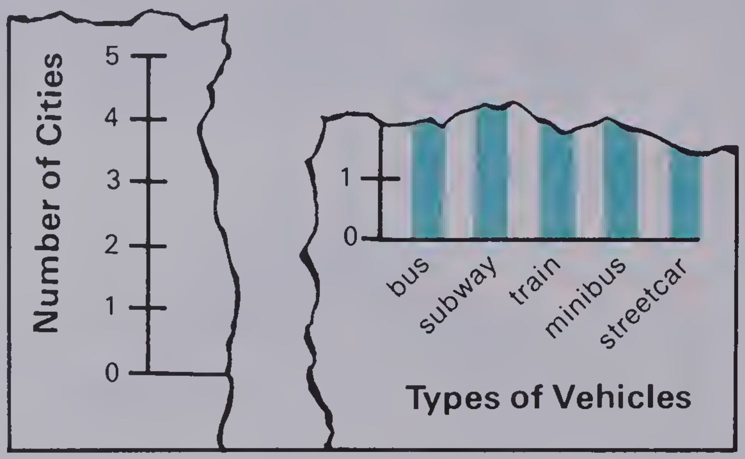
8. If a piece of cardboard is enclosed in an envelope, its length and width cannot be more than 15 mm smaller than the length and width of the envelope. What are the minimum measurements of a piece of cardboard enclosed in an envelope measuring 140 mm by 90 mm?

10. What is the area of an envelope measuring 14 cm by 9 cm?

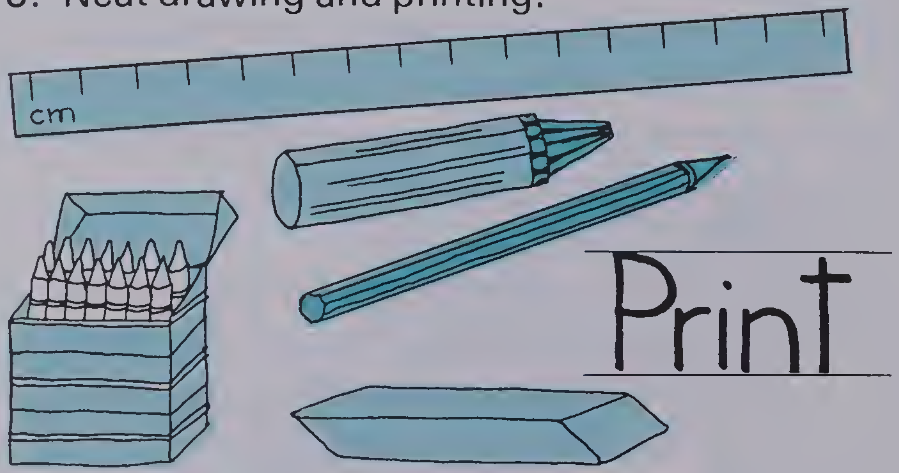
EXPLORE

GRAPHS/ What Makes a Good Graph?

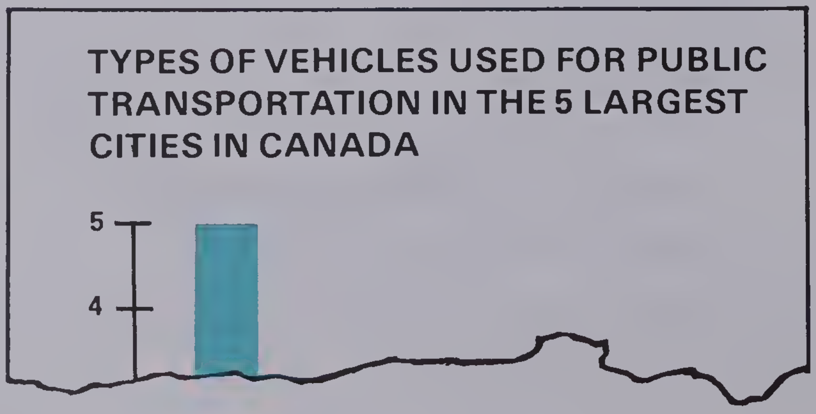
1. Good use of space.
   Decide how much space you want to fill.
2. Scales named accurately.



3. Neat drawing and printing.



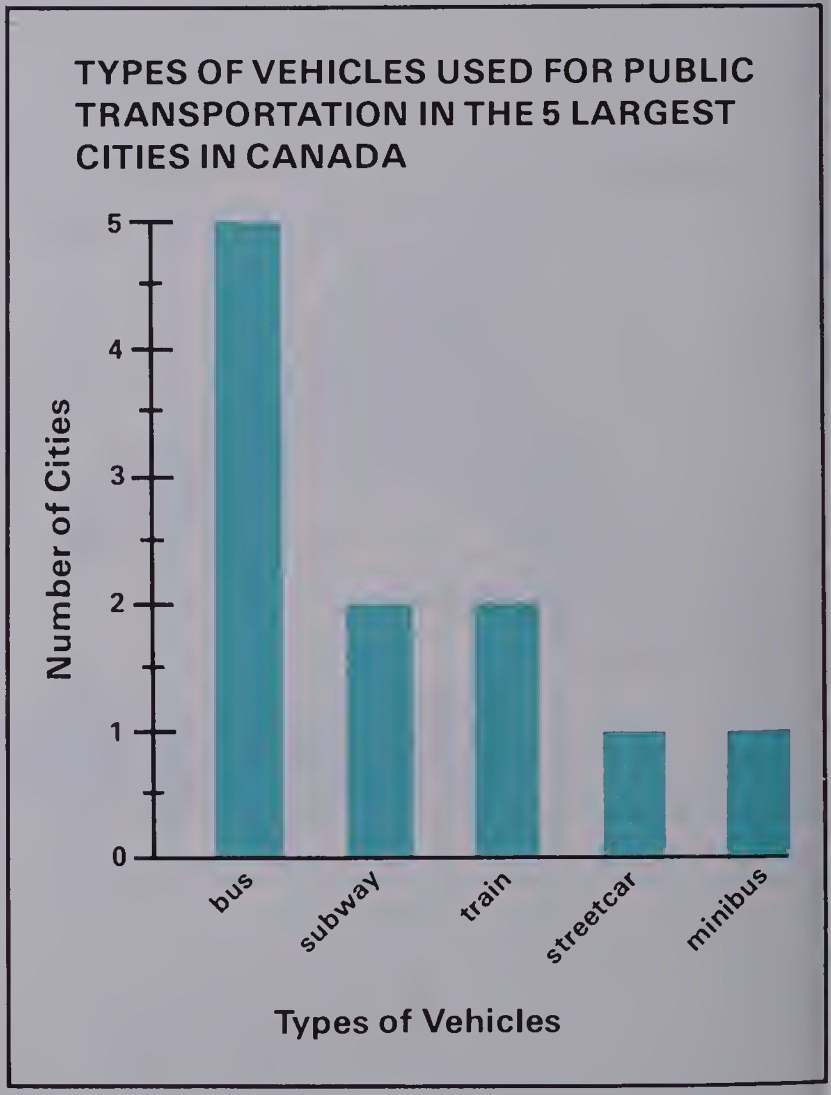
4. Descriptive title.


TYPES OF VEHICLES USED FOR PUBLIC TRANSPORTATION IN THE 5 LARGEST CITIES IN CANADA

5. Data expressed accurately.

TALLY SHEET: TRANSPORTATION

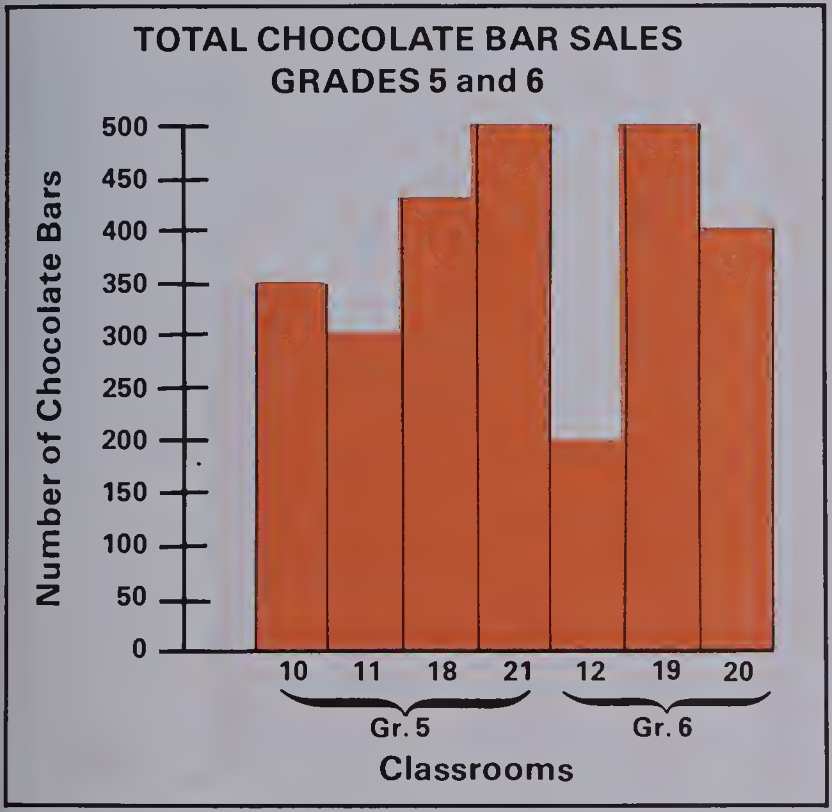
Bus	𝍸
Subway	//
Train	//
Streetcar	/
Minibus	/


TYPES OF VEHICLES USED FOR PUBLIC TRANSPORTATION IN THE 5 LARGEST CITIES IN CANADA

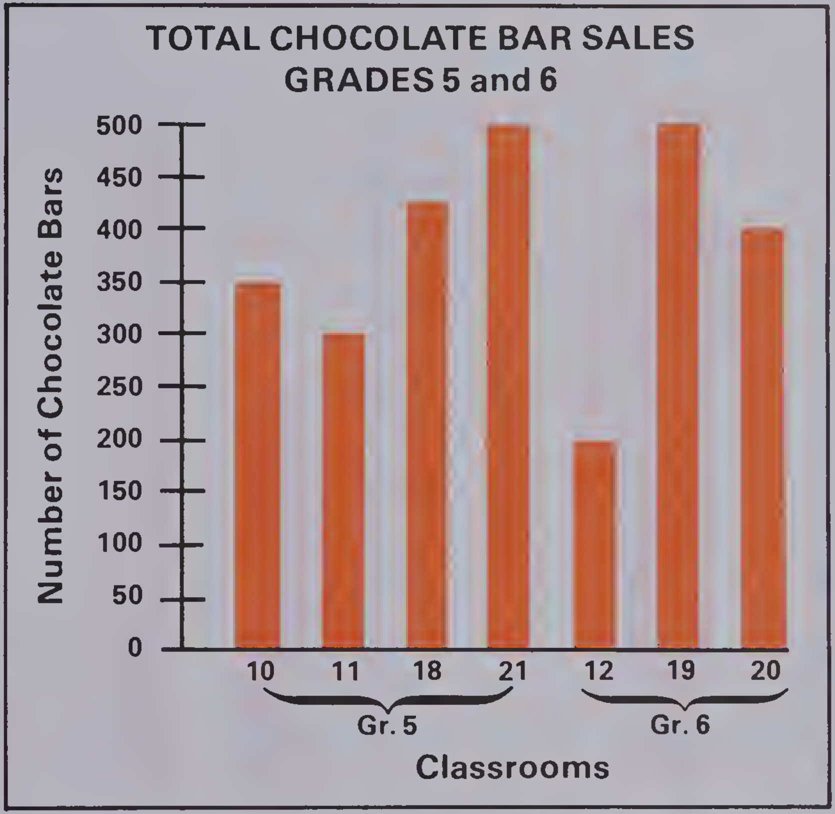
Scale: 2 units represent 1 city

Another Way to Draw a Bar Graph

Graph A



Graph B



2 students graphed the final results for their school's chocolate bar sale.
Check the graphs with the 5 points for making a good graph.
Have the 5 points for a good graph been followed?
Compare graph A with graph B. What is the same in each graph?
What is different?
Which graph would you use for a school display?
Why did you make your choice?

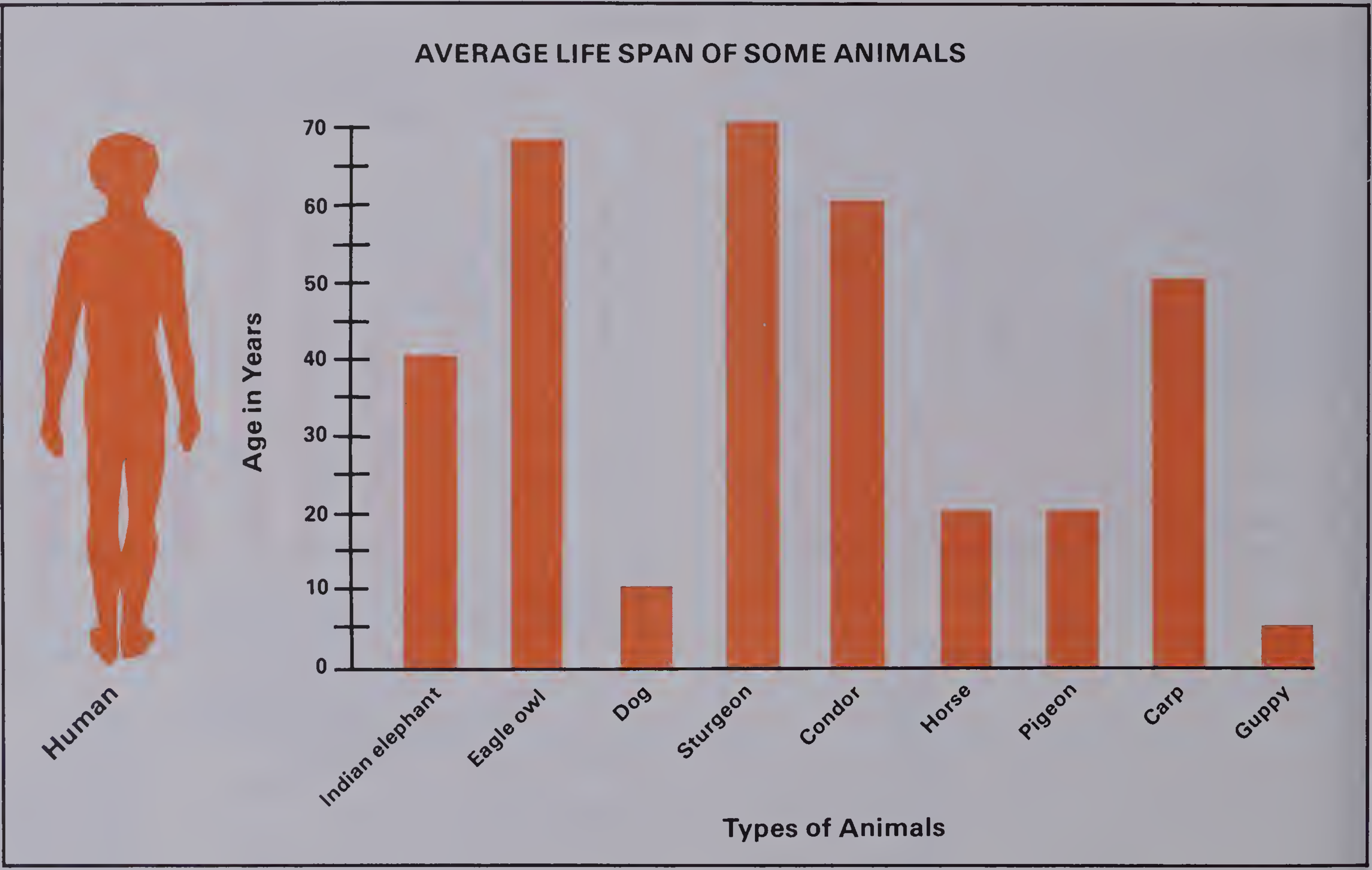
IN ACTION

1. Total amount of snow to the nearest 10 cm for 1 year:

Regina	110 cm	Vancouver	240 cm
Toronto	140 cm	Charlottetown	380 cm
Calgary	170 cm	Ottawa	410 cm

Draw your graph with spaces between the bars.
Use the scale 4 cm represent 100 cm.
Check your graph with the 5 points for making a good graph.

Using the Information in a Bar Graph



A science magazine used this graph to illustrate the average life span of different animals.

What can this graph tell you?
Sort the information into 2 groups:

a) those animals with a life span similar to human beings
b) those animals with a life span less than human beings

Name each group.

Sort the information into 3 sets: mammals, birds, fish.
How many members are there in each set?
What is the vertical scale?
Compare the ages of all animals in each of the groups.
Do the animals of each group live to be the same age?

Make up a question about this graph to ask your class.

IN ACTION

1. Here is a tally for the maximum life span of some animals.

Box turtle	100 years	Goose	50 years	Rabbit	15 years
River mussel	70 years	Whale	50 years	Earthworm	10 years
Cockatoo	60 years	Clam	40 years	Guinea pig	10 years

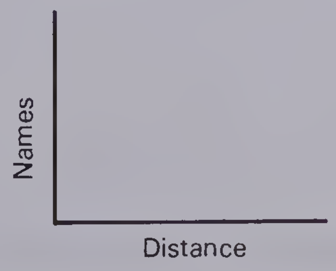
   a) Draw a bar graph for this data.
      Leave a space between each bar.
      Scale: 1 unit represents 10 years
   b) Make up 3 questions to ask about your graph.

2. A group of children practised their jumping from a standing position.
   The distance was measured and recorded as follows:

Tim	180 cm	Ellen	120 cm	Ingrid	160 cm
Maria	120 cm	Vicki	140 cm	Joel	100 cm
Gino	140 cm	Fernando	140 cm	Dawn	180 cm
Antonio	160 cm	Clyde	160 cm		

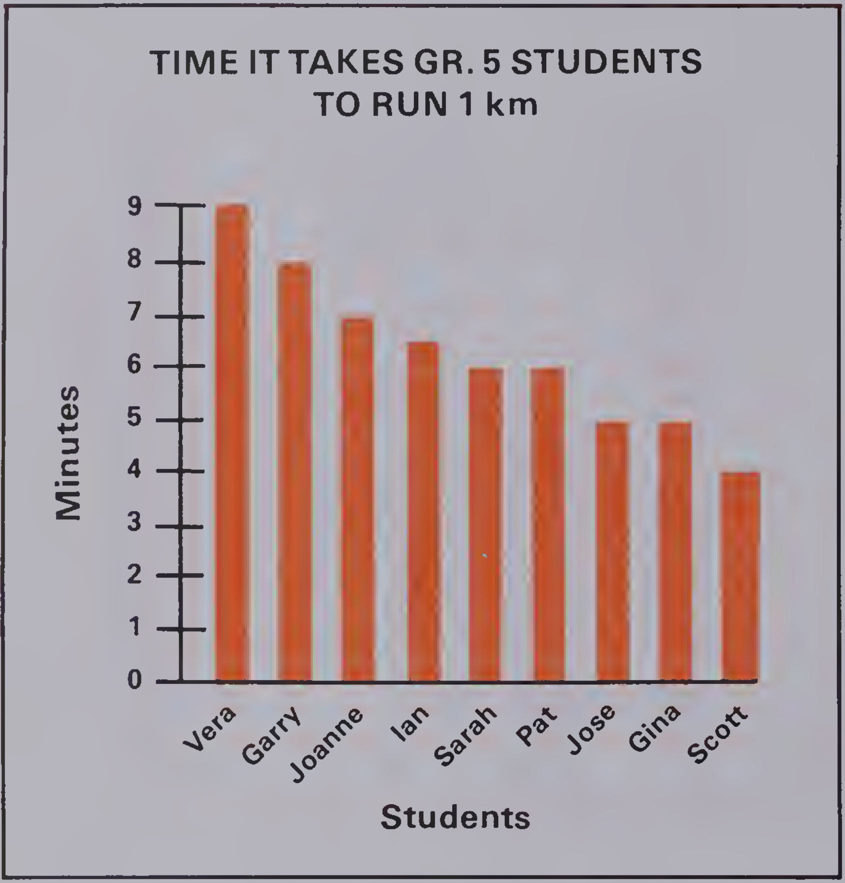
   a) Draw a bar graph leaving a space between each bar. Use the scale:
      3 cm represents 100 cm (30 mm = 100 cm; 6 mm = 20 cm).
   b) Use your graph to answer these questions.
      i) Who jumped the farthest?
      ii) How much farther than Antonio did the winner jump?
      iii) How many metres did Tim jump?
      iv) Can you jump farther than the winner?
      Try your jump in the playground.
      Add your name and distance to your graph.

3. Draw another graph for the data given in Question 2.
   This time, write the names of the jumpers on the vertical scale and the distance jumped on the horizontal scale.
   Has the information been changed in any way?
   When might you use this method of graphing?

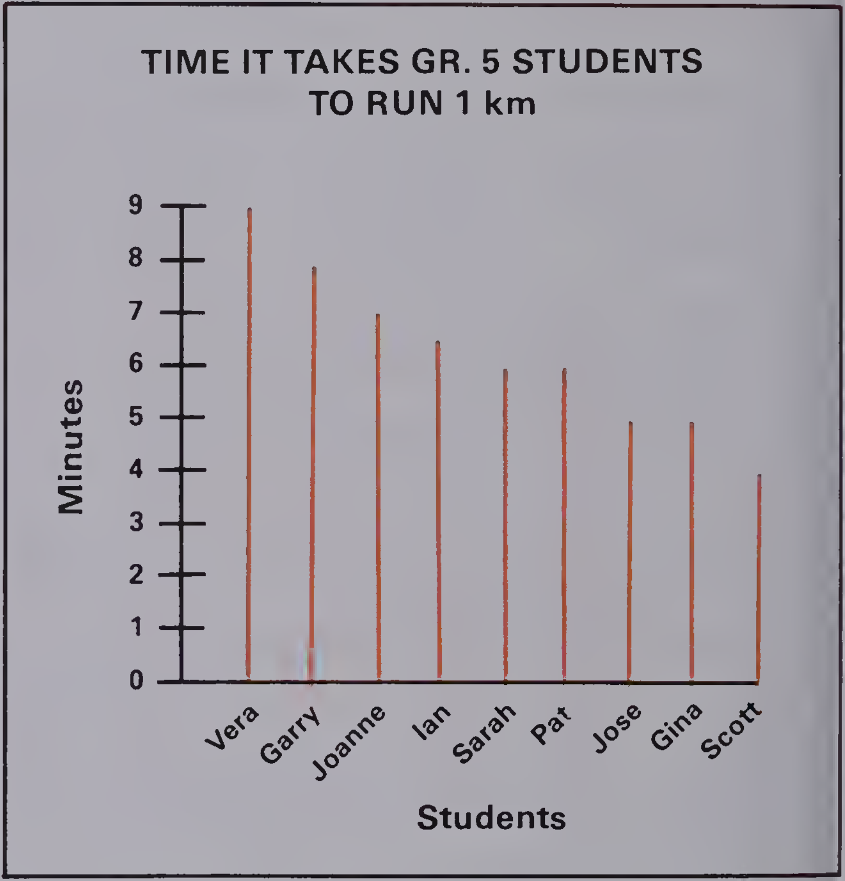


Straight Line Graphs

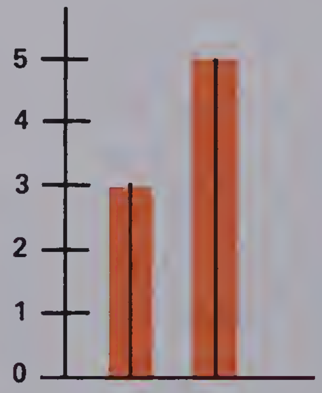
Bar Graph



Straight Line Graph

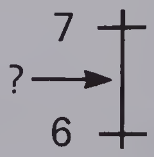


Straight line graphs are easy to draw.
Compare the straight line graph with the bar graph.



Has the vertical scale been changed?
Has the horizontal scale been changed?
Has the title been changed?

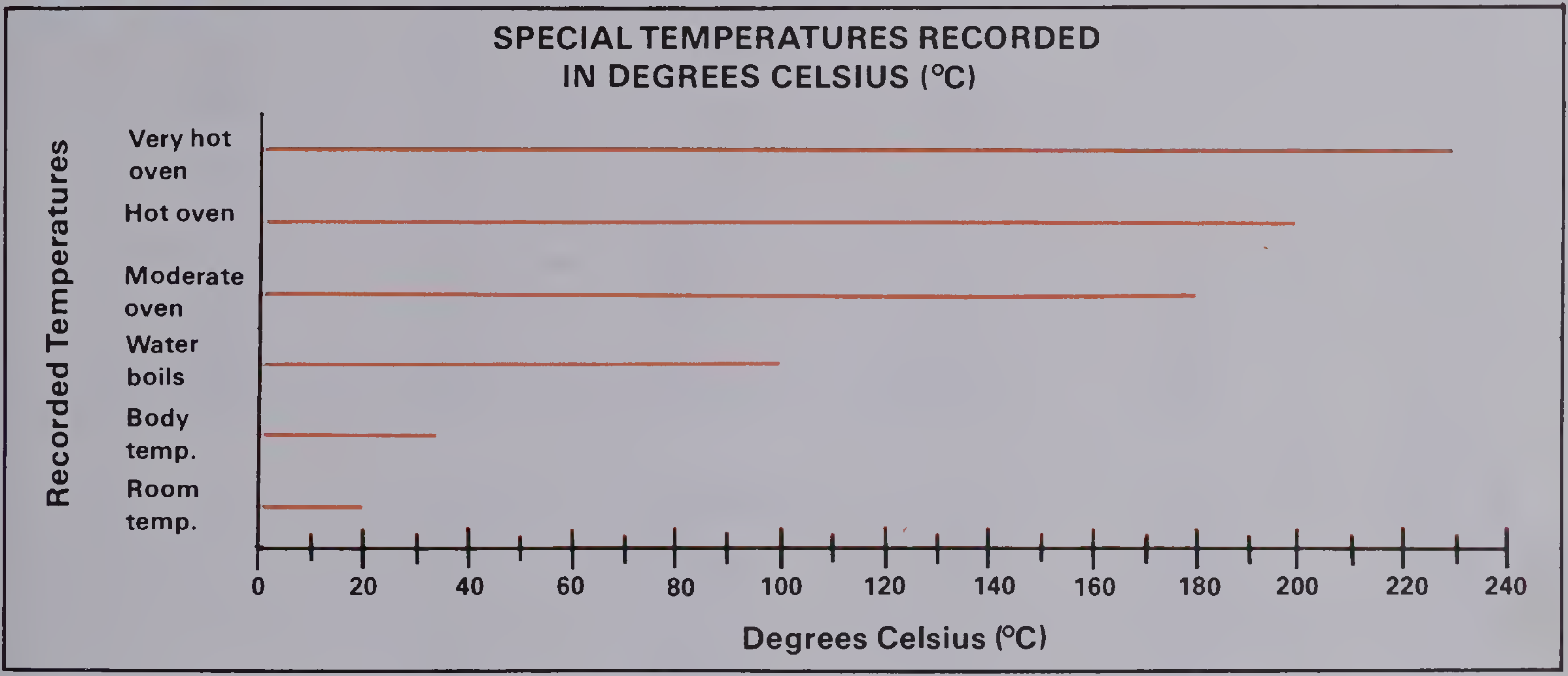
We draw this kind of graph by using a straight line instead of a bar. Think of the straight line as running up the centre of the bar.
Let's read the straight line graph.
By how many minutes did the fastest runner win over the slowest?
What is Ian's time for 1 km?
This shows part of the vertical scale.



What was the difference between Vera's time and Ian's time?

IN ACTION

1.



SPECIAL TEMPERATURES RECORDED IN DEGREES CELSIUS (°C)

a) Why would it be better to draw this graph with the vertical scale representing degrees Celsius?

b) Which temperature is difficult to read? How would you correct this difficulty?

c) Approximately how many times greater than room temperature is:

   i) body temperature?
   ii) temperature for boiling water?
   iii) hot oven temperature?
   iv) moderate oven temperature?

2. Draw and name a straight line graph for these temperatures:

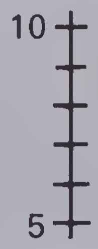
cold 0°C	mild 20°C	hot 30°C
cool 10°C	warm 25°C	your classroom temperature

Use the scale 1 cm represents 5°C.

3. The normal human body temperature is 37°C. Here is the data for the body temperatures (to the nearest degree Celsius) of several animals.

horse	38°C	cattle	38°C	cat	39°C
dog	39°C	sheep	40°C	chicken	42°C

Draw and name a straight line graph using the scale 2 cm represent 5°C.
Divide each 2 cm unit into 5 equal parts.



Unit 2, Check 1

Check your own progress. The answers are on page 168.

1. Add.

a) 4	b) 6	c) 14	d) 49	e) 148	f) 498
6	9	26	71	291	762
3	5	39	39	472	399
9	7	52	62	538	741

g) 1.4	h) 3.8	i) 1.23	j) 8.32	k) 18.4	l) 6.2
2.6	7.4	4.91	9.49	32.9	40.3
5.2	9.6	8.49	1.16	61.6	19.0
4.9	8.5	7.68	2.85	32.8	82.5

2. Subtract.

a) 432	b) 428	c) 490	d) 8493	e) 7624
191	396	245	4502	3509

f) 56.2	g) 8.46	h) 4.863	i) 84.93	j) 328.4
38.2	5.85	1.929	52.97	149.7

3. Multiply.

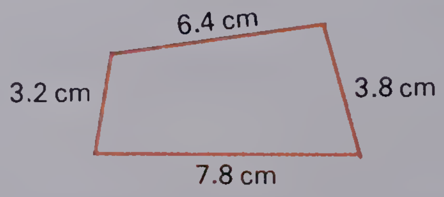
a) 32	b) 87	c) 687	d) 962	e) 438	f) 684
5	7	3	8	9	6

g) 3.2	h) 8.7	i) 68.7	j) 9.62	k) 4.38	l) 6.84
5	7	3	8	9	6

4. Divide.

a) 10 ÷ 10	b) 60 ÷ 10	c) 90 ÷ 10	d) 60 ÷ 20
e) 40 ÷ 40	f) 90 ÷ 30	g) 100 ÷ 10	h) 300 ÷ 30
i) 500 ÷ 5	j) 700 ÷ 7	k) 800 ÷ 20	l) 900 ÷ 30

5. What is the distance around a quadrilateral 3.2 cm by 6.4 cm by 3.8 cm by 7.8 cm?



6. What number is twice 38.4? .
7. What number is 4 times 9.36?
8. What is the difference between 52.4 and 80.1?

Practice 1

1. Write 1 multiplication question and 2 division questions for each array.

a) × × × × × × × × ×
× × × × × × × × ×
× × × × × × × × ×
× × × × × × × × ×

b) × × × × × × ×
× × × × × × ×
× × × × × × ×
× × × × × × ×
× × × × × × ×
× × × × × × ×

2. Illustrate the following division questions by grouping ×'s.
a) 6 ÷ 3 b) 18 ÷ 6 c) 24 ÷ 6 d) 24 ÷ 8 e) 24 ÷ 2

3. Divide.
a) 20 ÷ 4 b) 36 ÷ 6 c) 56 ÷ 7 d) 81 ÷ 9 e) 72 ÷ 8 f) 54 ÷ 6
g) 147 ÷ 7 h) 220 ÷ 5 i) 288 ÷ 8 j) 546 ÷ 6 k) 324 ÷ 4 l) 396 ÷ 6

4. Divide.
a) 30 ÷ 7 b) 60 ÷ 8 c) 43 ÷ 6 d) 49 ÷ 5 e) 74 ÷ 8 f) 79 ÷ 9
g) 157 ÷ 3 h) 307 ÷ 6 i) 340 ÷ 9 j) 510 ÷ 8 k) 162 ÷ 5 l) 802 ÷ 9

5. There are 30 students in a class.
How many groups of 5 can you make?

6. There are 24 candies.
How many will each of 8 girls receive?

7. 10 boys scored an equal number of goals totalling 50.
How many goals did each boy score?

8. A class baked 350 cookies for a bake sale.
5 cookies were put into a package.
How many packages were there to sell?

9. A school divided its 648 students into 9 large play groups.
How many students were in each group?

10. 36 children shared 6 utility balls.
How many children shared 1 ball?

Unit 2, Check 2

1. Divide.

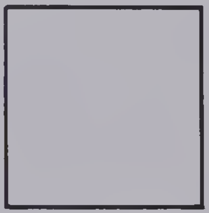
a) $6\overline{)15.0}$ b) $4\overline{)16.8}$ c) $3\overline{)9.9}$ d) $8\overline{)44.8}$ e) $5\overline{)32.5}$

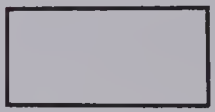
f) $9\overline{)20.7}$ g) $7\overline{)28.7}$ h) $8\overline{)24.8}$ i) $2\overline{)17.6}$ j) $6\overline{)25.8}$

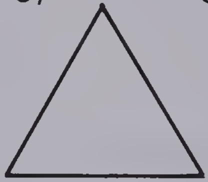
k) $7\overline{)35.7}$ l) $5\overline{)31.0}$ m) $9\overline{)27.9}$ n) $4\overline{)37.2}$ o) $6\overline{)49.8}$

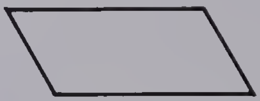
p) $3\overline{)26.7}$ q) $8\overline{)51.2}$ r) $7\overline{)65.1}$ s) $4\overline{)33.6}$ t) $9\overline{)54.9}$

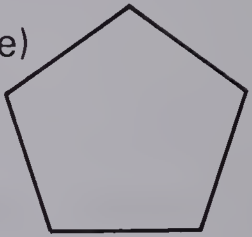
2. Find the number of lines of symmetry for each figure.

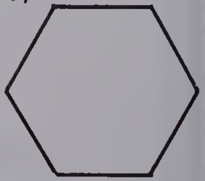
a)


b)


c)


d)


e)


f)


3. Use the symbol > or = or < to write correct sentences.

a) 400 ? 40 × 10 b) 30 × 1 ? 30 × 0.1 c) 24.5 ÷ 1 ? 2.45 × 10

d) 24.4 ? 24.4 ÷ 0.1 e) 35.2 × 10 ? 352 ÷ 10 f) 9.56 × 10 ? 95.6 × 0.1

g) 46.3 ? 463 ÷ 0.1 h) 1.24 × 100 ? 12.4 × 10 i) 5.4 × 100 ? 5400

4. Multiply.

a) 24 by 0.3 b) 8.7 by 4 c) 3.8 by 6 d) 56 by 0.8

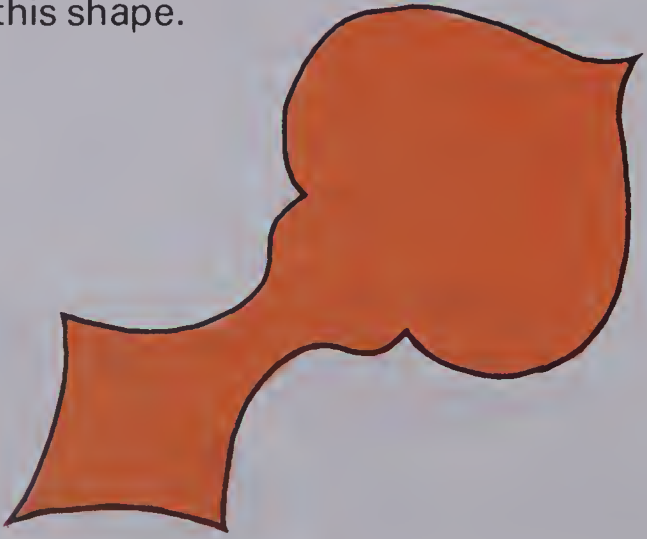
e) 6.9 by 4 f) 125 by 0.6 g) 43.2 by 8 h) 64.2 by 5

i) 813 by 0.6 j) 4.18 by 3 k) 612 by 0.9 l) 104 by 0.7

m) 0.125 by 4 n) 0.820 by 5 o) 1.4 by 0.6 p) 3.9 by 0.9

q) 2.16 by 0.4 r) 3.62 by 0.6 s) 2.15 by 0.5 t) 4.06 by 0.7

5. Trace this shape.

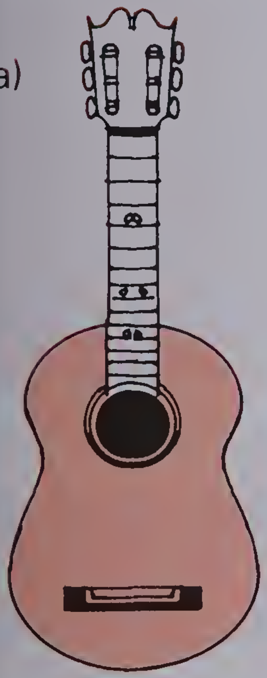


a) Create a slide pattern of 4 slides.
b) Create a flip pattern of 3 flips.
c) Create a turn pattern of $\frac{1}{4}$ turns.

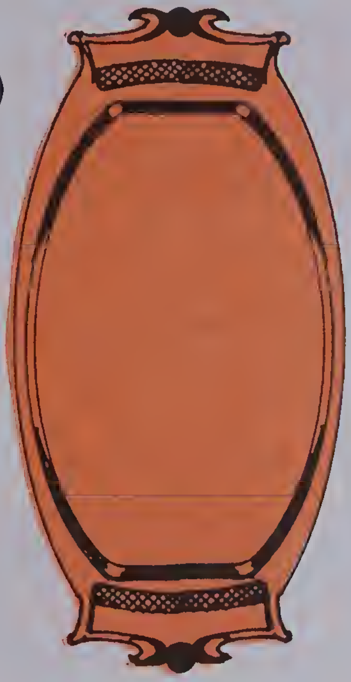
Practice 2

1. Trace and draw the lines of symmetry for each object.

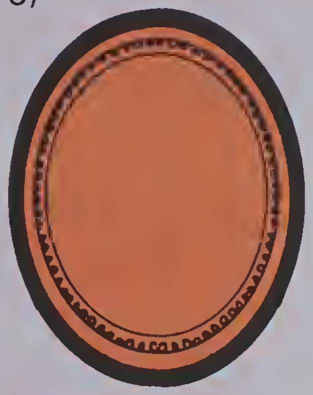
a)



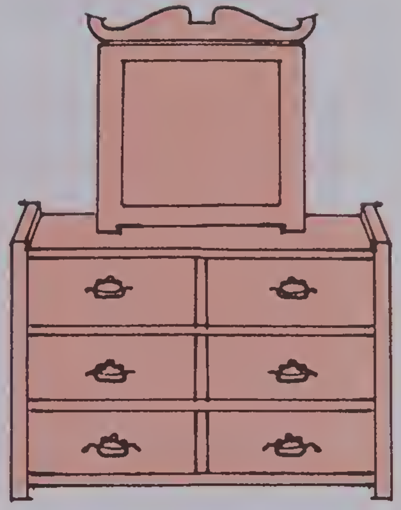
b)



c)

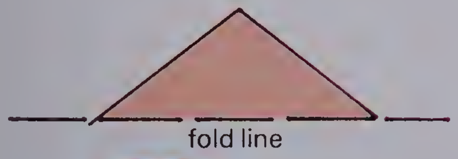


d)

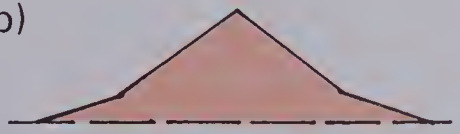


2. Trace each figure and draw its reflection.

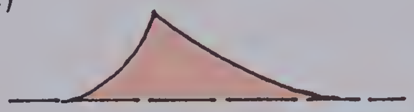
a)



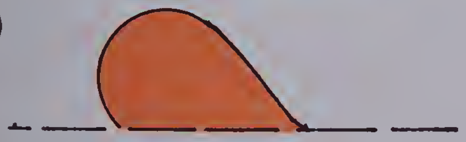
b)



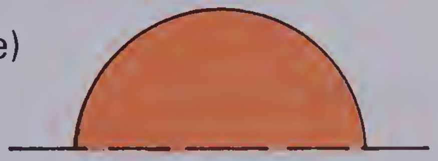
c)



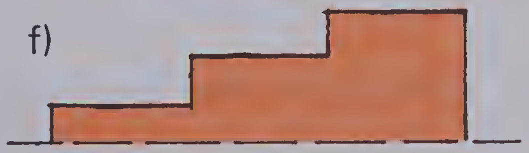
d)



e)



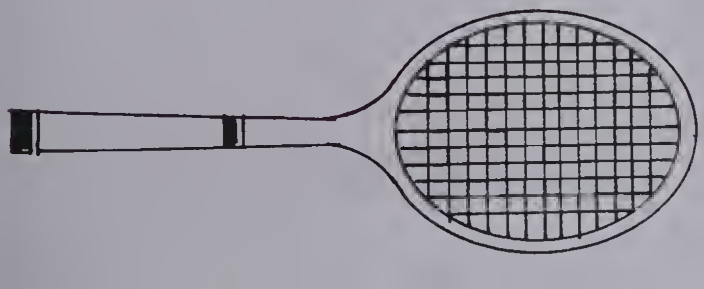
f)



3. Divide the first number of the number pair by the second number.

a) (485,10)
b) (485,100)
c) (485,0.1)
d) (485,1)
e) (48.5,10)
f) (631,100)
g) (631,1)
h) (631,0.1)
i) (63.1,0.1)
j) (6.31,100)
k) (904,0.1)
l) (904,100)
m) (9.04,10)
n) (90.4,1)
o) (90.4,10)
p) (28.3,1)
q) (28.3,10)
r) (283,0.1)
s) (28.3,100)
t) (283,10)

4.

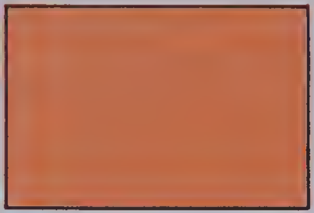


a) Create a slide pattern of 3 slides.
b) Create a flip pattern of 4 flips.
c) Create a turn pattern of $\frac{1}{4}$ turns.

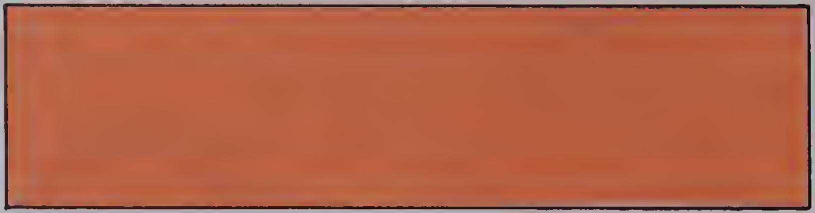
Unit 2, Check 3

1. Calculate the area in square centimetres.

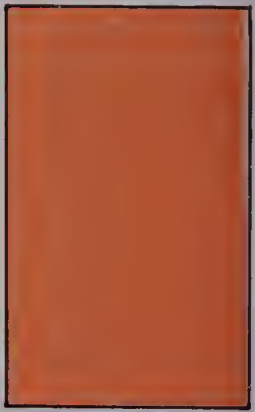
a)



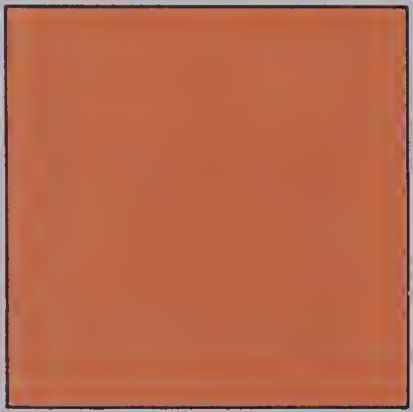
b)



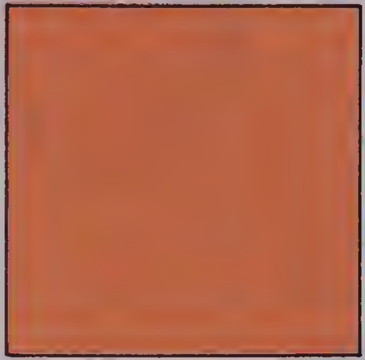
c)



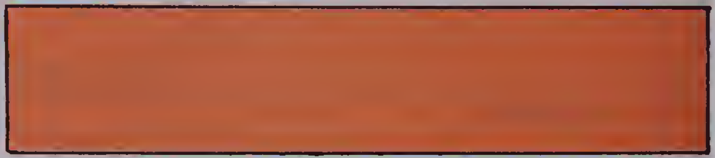
d)



e)



f)



2. Complete.

a) $\frac{1}{2} + \frac{3}{2} = ?$ b) $\frac{1}{4} + \frac{1}{2} = ?$ c) $\frac{1}{2} + \frac{2}{4} = ?$ d) $\frac{1}{5} + \frac{1}{10} = ?$ e) $\frac{2}{10} + \frac{1}{5} = ?$

3. Complete.

a) $\frac{3}{2} - \frac{1}{2} = ?$ b) $\frac{4}{5} - \frac{1}{5} = ?$ c) $\frac{3}{4} - \frac{1}{2} = ?$ d) $\frac{5}{10} - \frac{1}{5} = ?$ e) $\frac{15}{10} - \frac{3}{5} = ?$

4. Complete, using the correct symbol $<$ or $=$ or $>$.

a) $\frac{1}{2}\ ?\ \frac{1}{4}$ b) $\frac{3}{5}\ ?\ \frac{2}{10}$ c) $\frac{3}{2}\ ?\ \frac{6}{4}$ d) $\frac{2}{2}\ ?\ \frac{10}{10}$ e) $\frac{5}{2}\ ?\ \frac{11}{4}$

5. Which is less?

a) $\frac{2}{5} + \frac{6}{10}$ or $\frac{3}{4} + \frac{1}{2}$ b) $\frac{3}{2} + \frac{2}{4}$ or $\frac{6}{5} - \frac{1}{10}$ c) $\frac{4}{5} + \frac{3}{10}$ or $\frac{2}{2} - \frac{3}{4}$

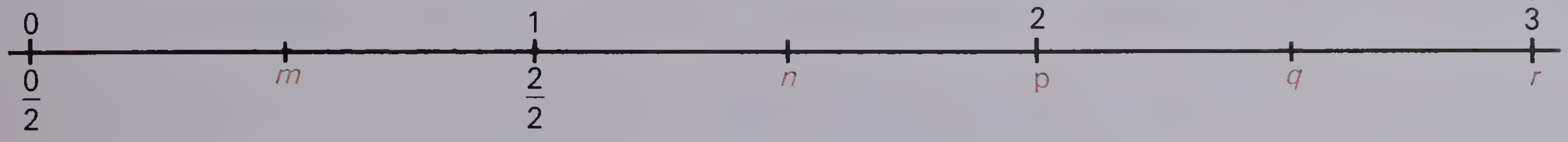
d) $\frac{6}{2} - \frac{1}{4}$ or $\frac{2}{5} + \frac{20}{10}$ e) $\frac{3}{2} + \frac{4}{4}$ or $\frac{6}{5} + \frac{6}{10}$ f) $\frac{1}{5} - \frac{1}{10}$ or $\frac{1}{2} - \frac{1}{4}$

g) $\frac{6}{5} - \frac{6}{10}$ or $\frac{4}{5} + \frac{6}{10}$ h) $\frac{1}{2} + \frac{6}{4}$ or $\frac{3}{2} - \frac{2}{4}$ i) $\frac{7}{2} - \frac{10}{4}$ or $\frac{6}{4} + \frac{1}{2}$

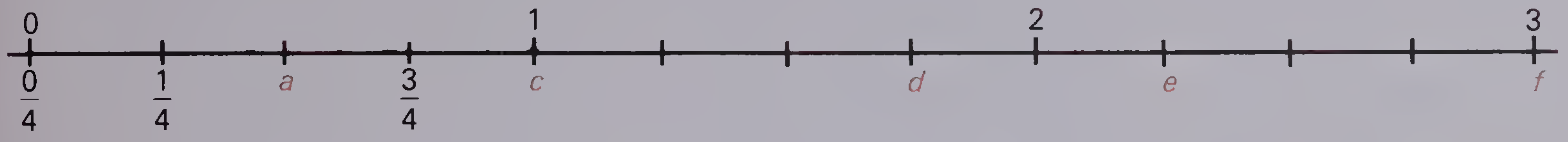
Practice 3

1. Copy the number lines. Write fractions for the points named by letters.

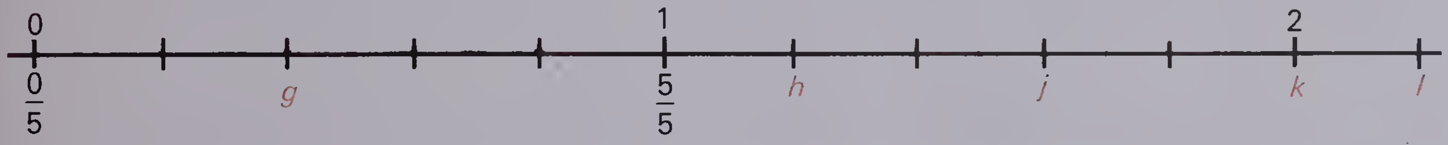
a)


0
1
2
3
0/2
m
2/2
n
p
q
r

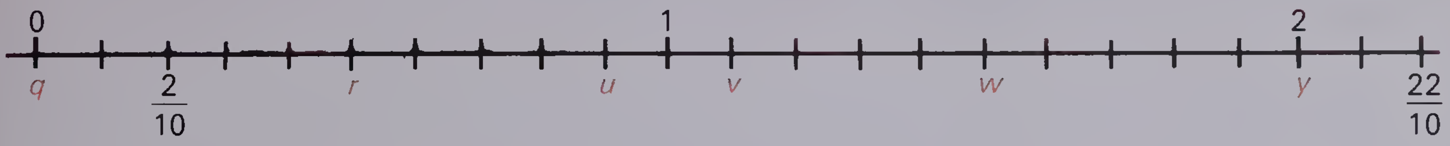
b)


0
1
2
3
0/4
1/4
a
3/4
c
d
e
f

c)


0
1
2
0/5
g
5/5
h
j
k
l

d)


0
1
2
q
2/10
r
u
v
w
y
22/10

2. Complete.

a) $\frac{1}{2} = \frac{?}{4}$

b) $\frac{1}{5} = \frac{?}{10}$

c) $\frac{4}{4} = ?$

d) $\frac{2}{5} = \frac{?}{10}$

e) $\frac{20}{10} = \frac{?}{5}$

f) $\frac{4}{2} = ?$

g) $\frac{12}{10} = \frac{?}{5}$

h) $\frac{3}{2} = \frac{?}{4}$

i) $\frac{6}{10} = \frac{?}{5}$

j) $\frac{11}{5} = \frac{?}{10}$

k) $\frac{10}{5} = ?$

l) $\frac{20}{10} = \frac{?}{4}$

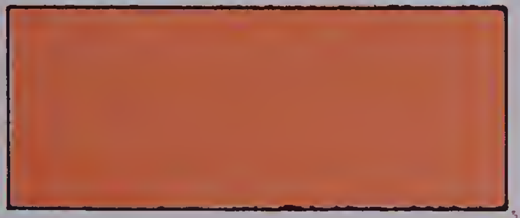
m) $\frac{?}{4} = \frac{5}{2}$

n) $\frac{?}{4} = \frac{8}{2}$

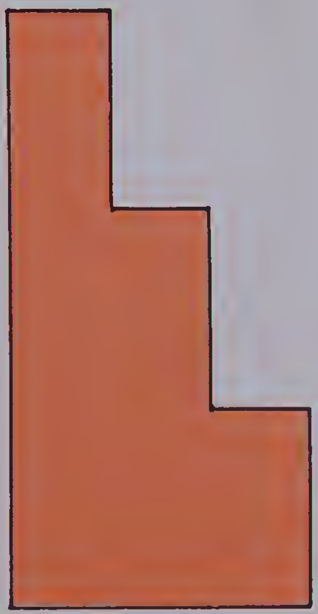
o) $\frac{?}{5} = \frac{30}{10}$

3. Estimate, then find the area in square centimetres.

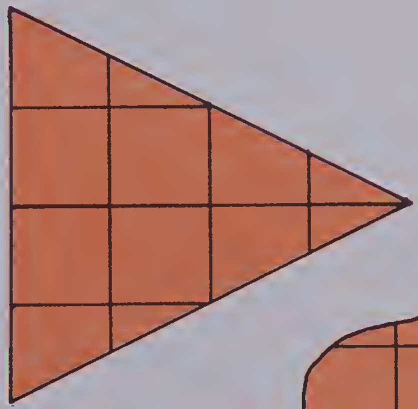
a)



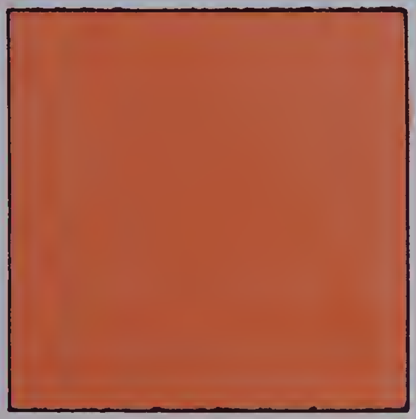
b)



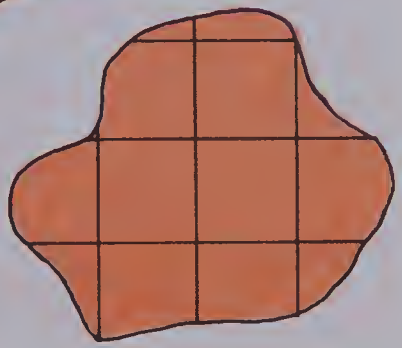
c)



d)



e)



Answers/Unit 2, Check 1

1. a) 22 b) 27 c) 131 d) 221 e) 1449 f) 2400
g) 14.1 h) 29.3 i) 22.31 j) 21.82 k) 145.7 l) 148.0

2. a) 241 b) 32 c) 245 d) 3991 e) 4115
f) 18.0 g) 2.61 h) 2.934 i) 31.96 j) 178.7

3. a) 160 b) 609 c) 2061 d) 7696 e) 3942 f) 4104
g) 16.0 h) 60.9 i) 206.1 j) 76.96 k) 39.42 l) 41.04

4. a) 1 b) 6 c) 9 d) 3 e) 1 f) 3
g) 10 h) 10 i) 100 j) 100 k) 40 l) 30

5. 21.2 cm 6. 76.8 7. 37.44 8. 27.7

Unit 2, Check 2

1. a) 2.5 b) 4.2 c) 3.3 d) 5.6 e) 6.5 f) 2.3 g) 4.1
h) 3.1 i) 8.8 j) 4.3 k) 5.1 l) 6.2 m) 3.1 n) 9.3
o) 8.3 p) 8.9 q) 6.4 r) 9.3 s) 8.4 t) 6.1

2. a) 4 b) 2 c) 3 d) 0 e) 5 f) 6

3. a) = b) > c) = d) < e) > f) > g) < h) = i) <

4. a) 7.2 b) 34.8 c) 22.8 d) 44.8 e) 27.6 f) 75.0 g) 345.6
h) 321.0 i) 487.8 j) 12.54 k) 550.8 l) 72.8 m) 0.500 n) 4.100
o) 0.84 p) 3.51 q) 0.864 r) 2.172 s) 1.075 t) 2.842

5. Answers will vary.

Unit 2, Check 3

1. a) 6 cm^2 b) 16 cm^2 c) 10 cm^2 d) 16 cm^2 e) 12.25 cm^2 f) 10.5 cm^2

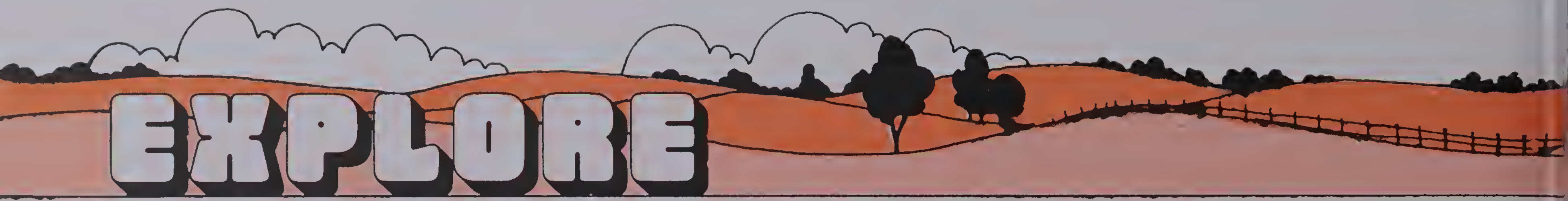
2 a) $\frac{4}{2}$ b) $\frac{3}{4}$ c) $\frac{4}{4}$ d) $\frac{3}{10}$ e) $\frac{4}{10}$

3 a) $\frac{2}{2}$ b) $\frac{3}{5}$ c) $\frac{1}{4}$ d) $\frac{3}{10}$ e) $\frac{9}{10}$

4. a) > b) > c) = d) = e) <

5. a) $\frac{2}{5} + \frac{6}{10}$ b) $\frac{6}{5} - \frac{1}{10}$ c) $\frac{2}{2} - \frac{3}{4}$ d) $\frac{2}{5} + \frac{20}{10}$ e) $\frac{6}{5} + \frac{6}{10}$ f) $\frac{1}{5} - \frac{1}{10}$ g) $\frac{6}{5} - \frac{6}{10}$ h) $\frac{3}{2} - \frac{2}{4}$ i) $\frac{7}{2} - \frac{10}{4}$

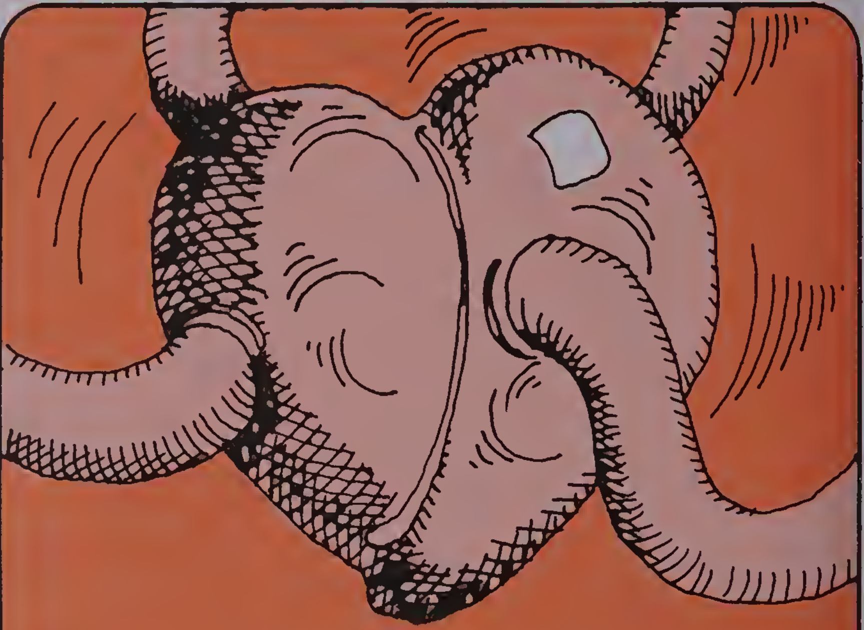
3
Ian Leventhal



PLACE VALUE/Thinking About a Million/1 000 000

If you lived for 1 million days, you would be over 2739 years old.

Happy 2739th



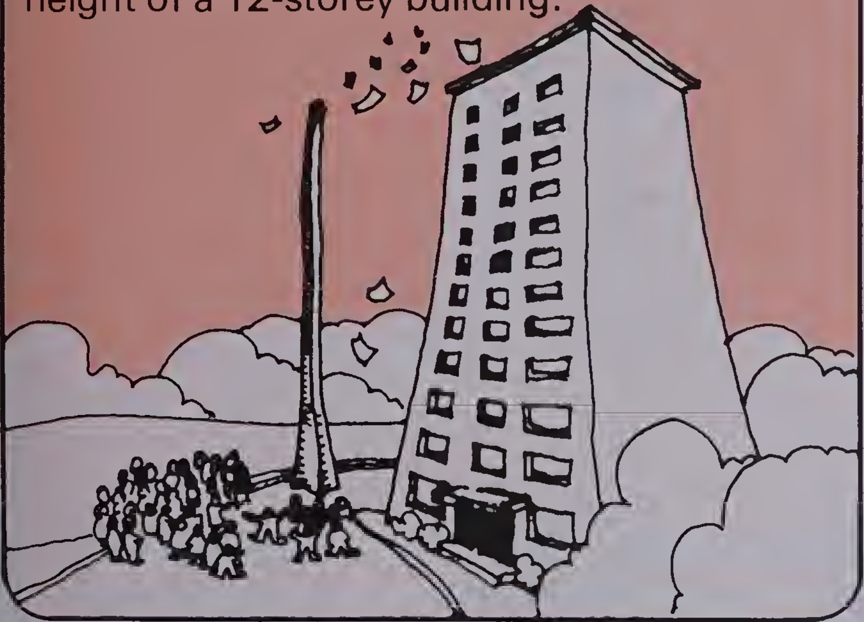
Your heart beats about 75 times per minute. It will take a little more than 9 days for it to beat 1 million times.

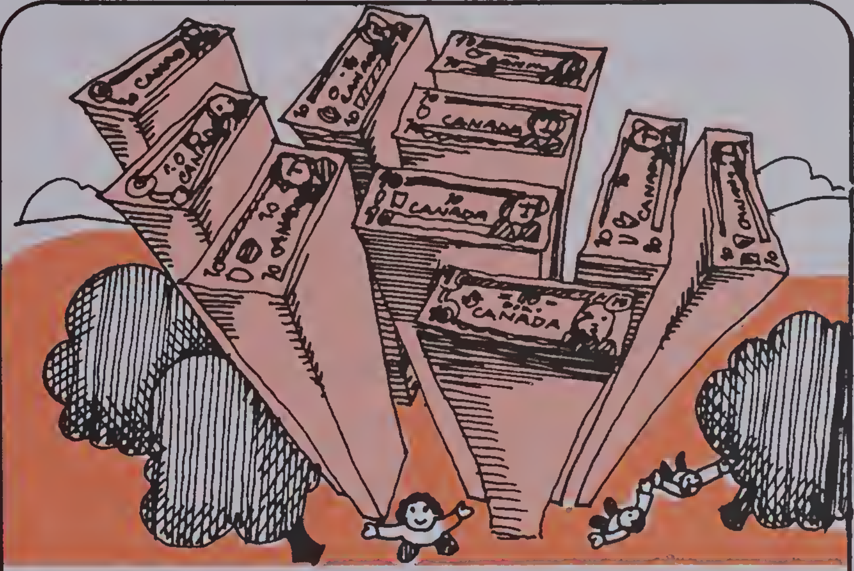
The distance from the earth to the moon is about 384 600 km. A spaceship would have to go from the earth to the moon, return to the earth, and go back halfway to the moon again before it travelled 1 million kilometres.

FINALLY I'VE EARNED 1 MILLION DOLLARS,... BUT NOTHING'S LEFT!

To earn 1 million dollars, you would have to work for almost 100 years at $200 per week.

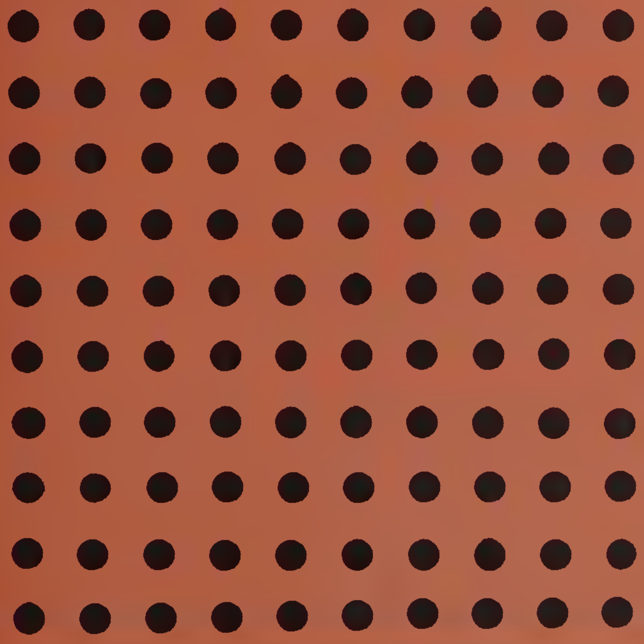
100 sheets of paper make a stack about 5 mm thick. 1 million sheets of this paper would make a pile about 50 m high, roughly the height of a 12-storey building.

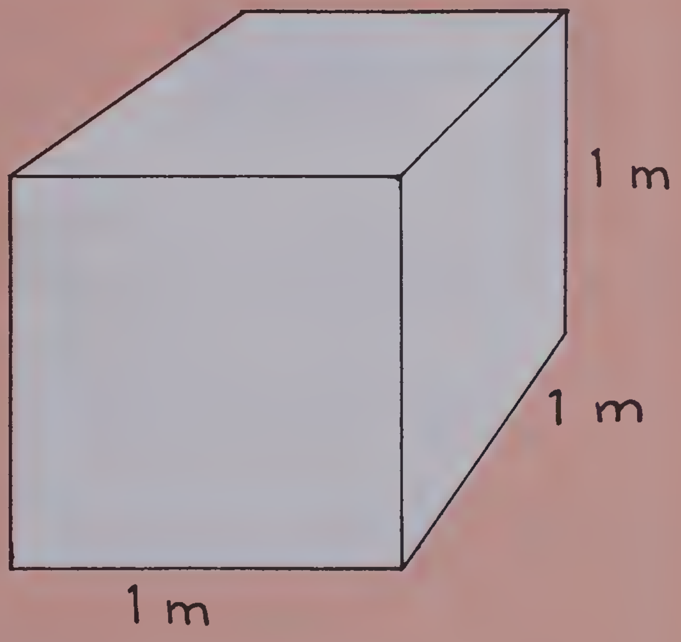




Suppose you could put 10 one-dollar bills side by side on the floor. If you stacked one-dollar bills on each of the 10 original bills until you had 10 stacks 13.5 m high, you would have about 1 million dollars.

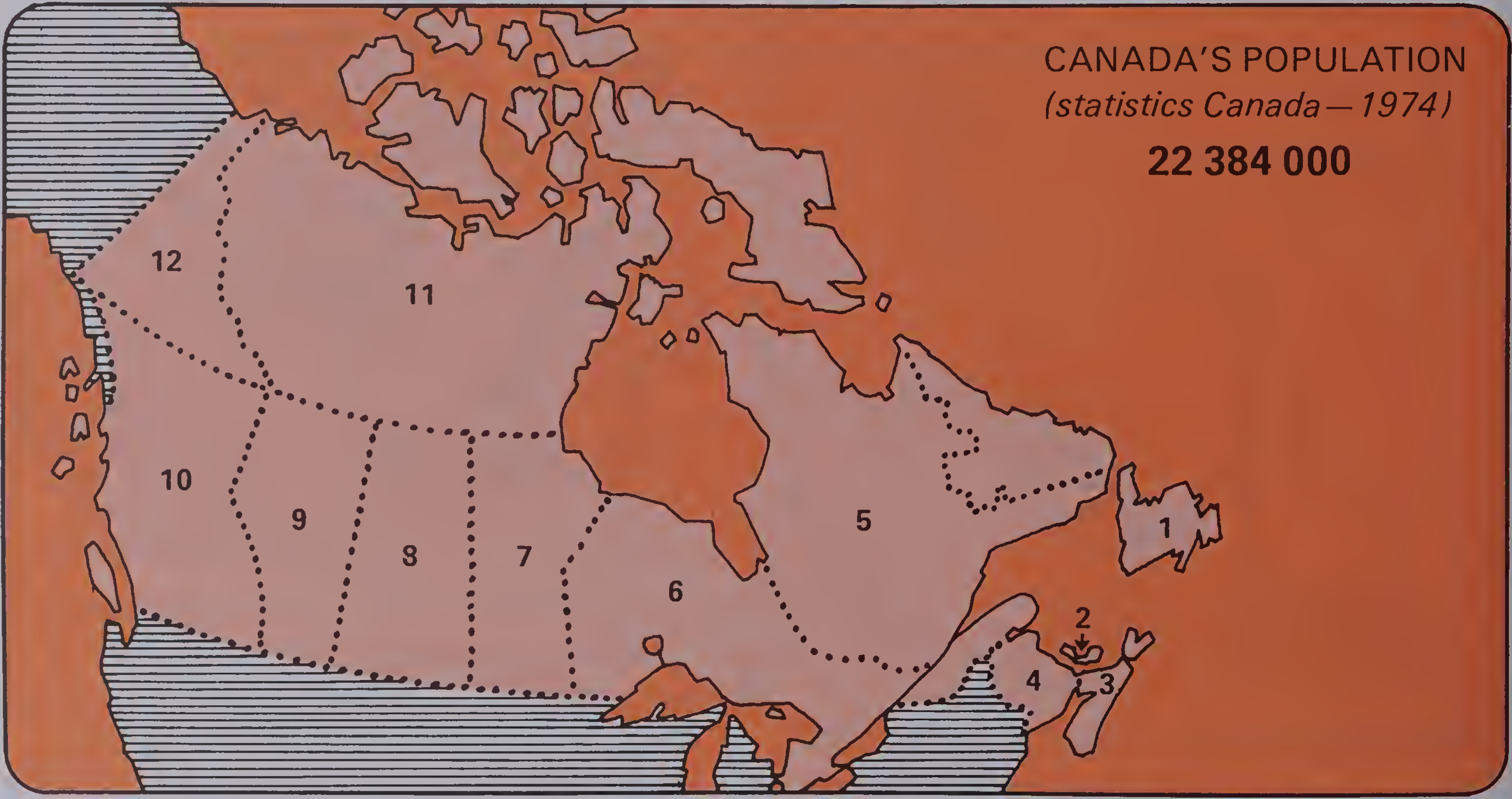
How many dots are in this array? You would need 10 000 of these arrays to make 1 million dots.





A 1 m^3 container holds 1 000 000 cm^3.

Millions


CANADA'S POPULATION
(statistics Canada — 1974)
22 384 000
1
2
3
4
5
6
7
8
9
10
11
12

1	Newfoundland	541 000	**2**	Prince Edward Island	116 000
3	Nova Scotia	811 000	**4**	New Brunswick	660 000
5	Québec	6 124 000	**6**	Ontario	8 067 000
7	Manitoba	1 008 000	**8**	Saskatchewan	907 000
9	Alberta	1 709 000	**10**	British Columbia	2 384 000
11	North West Territories	38 000	**12**	Yukon Territory	19 000

22 384 000

(read as "twenty-two million, three hundred and eighty-four thousand")

EXPANDED FORM

20 000 000 + 2 000 000 + 300 000 + 80 000 + 4000 + 0 + 0 + 0

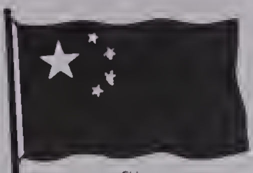
PLACE VALUE CHART

10 000 000	1 000 000	100 000	10 000	1000	100	10	1
2	2	3	8	4	0	0	0

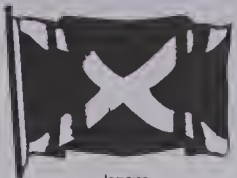
IN ACTION

1. How would you read the numbers that represent the populations of Canada's provinces and territories? Write your answers.
2. Use the expanded form to show the populations of the Maritime Provinces and the Prairie Provinces.
3. Use a place value chart to show the populations of Québec, Ontario, British Columbia, the North West Territories, and the Yukon Territory.
4. Arrange the populations of the provinces and territories from greatest to least.
5. Canada's population in 1974 was 22 384 000. What is the value of each of the coloured digits?

Australia

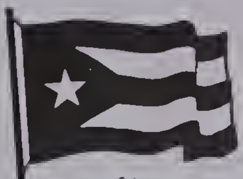

China

Great Britain

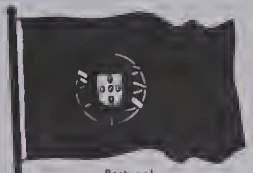

Jamaica

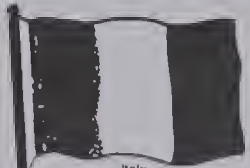
United States

Canada


Cuba

India


Portugal


Italy

6.

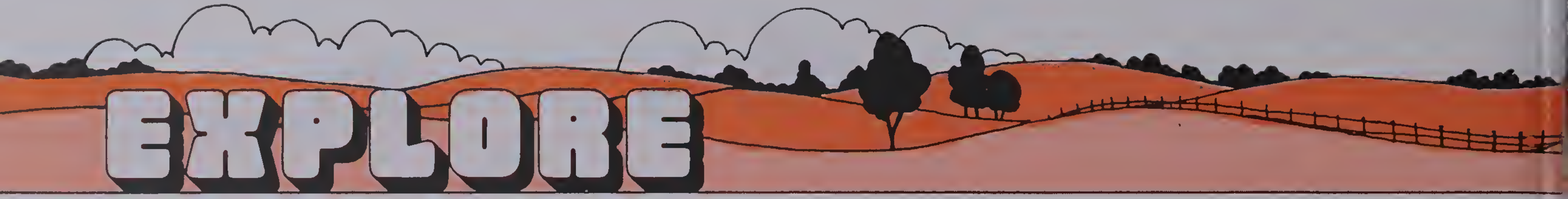
Australia	13 268 000	Great Britain	55 930 000	Pakistan	73 321 000
Canada	22 384 000	India	574 220 000	Portugal	8 560 000
China	790 000 000	Italy	55 262 000	U.S.A.	211 210 000
Cuba	8 870 000	Jamaica	2 033 000	U.S.S.R.	250 900 000
France	52 350 000	Japan	108 710 000		

a) List the countries with populations greater than Canada's. Put these in order from greatest to least.

b) List the countries with populations less than Canada's. Put these in order from least to greatest.

c) Look at an atlas. Which of the countries listed above seems to have the greatest population for its size?

d) Which of the countries listed above seems to have the least population for its size?



EXPLORE

EXPONENTS

$$5 \times 5 = 5^{2} \rightarrow \text{exponent}$$

We can express 5 × 5 a shorter way by using an **exponent.**

$$5 \times 5 \times 5 = 5^{3} \rightarrow \text{exponent}$$

Express 5 × 5 × 5 a shorter way by using an **exponent.**

$$5 \times 5 \times 5 \times 5 = ?$$

We can use an exponent to express the number 5^{4}

IN ACTION

1. Express using exponents.
   a) 3 × 3 b) 2 × 2 × 2 c) 5 × 5 × 5 × 5 d) 4 × 4 × 4 e) 2 × 2 × 2 × 2 × 2
   f) 8 × 8 × 8 g) 7 × 7 × 7 × 7 h) 6 × 6 × 6 × 6 × 6 × 6 i) 9 × 9 j) 10 × 10
2. Express using factors.
   a) 5^{4} b) 9^{7} c) 2^{3} d) 8^{5} e) 3^{2} f) 10^{6} g) 7^{2} h) 6^{3}
3. Find the value.
   a) 3^{5} b) 6^{3} c) 4^{2} d) 10^{4} e) 2^{7} f) 5^{5} g) 9^{3} h) 7^{2}

4. Copy and complete the chart.

Multiplication sentence	Number of times factor used	Using exponents	Value
a) $5 \times 5 \times 5$	3	5^3	125
b) $2 \times 2 \times 2 \times 2$			
c) 9×9			
d) $4 \times 4 \times 4 \times 4$			
e) 8×8			
f) $3 \times 3 \times 3 \times 3 \times 3$			
g) $10 \times 10 \times 10 \times 10$			
h) 6×6			
i) $7 \times 7 \times 7$			
j) $10 \times 10 \times 10 \times 10 \times 10 \times 10$			

5. Complete.

a) $4 \times 4 \times 4 = 4^?$
b) $?^2 = 100$
c) $?^5 = 10 \times 10 \times 10 \times 10 \times 10$
d) $9^3 = \ ?$
e) $7^? = 7 \times 7 \times 7 \times 7$
f) $2^6 = \ ?$
g) $8^? = 512$
h) $3^? = 3 \times 3 \times 3$
i) $5^? = 3125$

6. Complete the patterns.

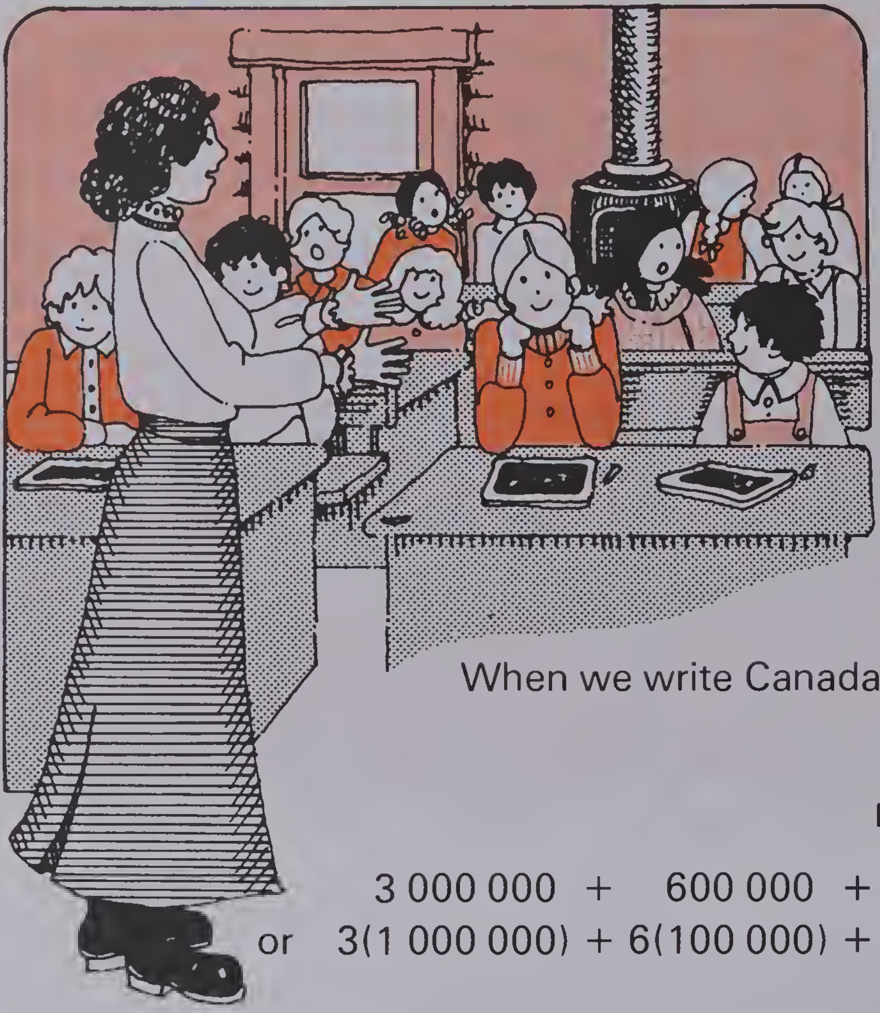
a) $2^1 = 2$
$2^2 = 2 \times 2 = 4$
$2^3 = \quad ? = \ ?$
$2^4 = \quad ? = \ ?$
$2^5 = \quad ? = \ ?$
$2^6 = \quad ? = \ ?$

b) $3^1 = 3$
$3^2 = 3 \times 3 = 9$
$3^3 = \quad ? = \ ?$
$3^4 = \quad ? = \ ?$
$3^5 = \quad ? = \ ?$
$3^6 = \quad ? = \ ?$

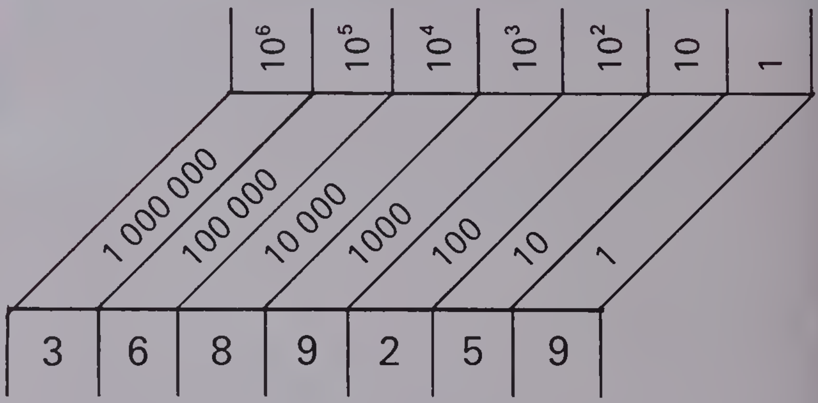
c) $5^1 = 5$
$5^2 = 5 \times 5 = 25$
$5^3 = \quad ? = \ ?$
$5^4 = \quad ? = \ ?$
$5^5 = \quad ? = \ ?$
$5^6 = \quad ? = \ ?$

d) $10^1 = 10$
$10^2 = 10 \times 10 = 100$
$10^3 = \quad ? = \ ?$
$10^4 = \quad ? = \ ?$
$10^5 = \quad ? = \ ?$
$10^6 = \quad ? = \ ?$

Large Numbers Using Exponents



PLACE VALUE CHART



Canada's population in 1871 was 3 689 259.

When we write Canada's 1871 population in the expanded form it looks like this.

EXPANDED FORM

$$3\,000\,000 + 600\,000 + 80\,000 + 9000 + 200 + 50 + 9$$

or $3(1\,000\,000) + 6(100\,000) + 8(10\,000) + 9(1000) + 2(100) + 5(10) + 9$

Using exponents the expanded form would be

$$3 \times (10^6) + 6 \times (10^5) + 8 \times (10^4) + 9 \times (10^3) + 2 \times (10^2) + 5 \times (10) + 9 \times (1)$$

or $3(10^6) + 6(10^5) + 8(10^4) + 9(10^3) + 2(10^2) + 5(10) + 9(1)$

IN ACTION

1. Write the standard numeral for each of the following.

a) $7 \times (10^3)$ b) $3 \times (10^5)$ c) $2 \times (10^2)$ d) $4 \times (10^4)$ e) $5 \times (10)$
f) $8(10^6)$ g) $6(10^2)$ h) $9(10^4)$ i) $3(10^3)$ j) $7(10^5)$

2. Write the expanded form using exponents.

THE POPULATION OF CANADA

a) 1881 — 4 324 810 b) 1891 — 4 833 239 c) 1901 — 5 371 315
d) 1911 — 7 206 643 e) 1921 — 8 787 949 f) 1931 — 10 376 786
g) 1941 — 11 506 655 h) 1951 — 14 009 429 i) 1961 — 18 238 247

ADDITION AND SUBTRACTION/Recall Adding and Subtracting with Decimals

ADDITION

$$\begin{array}{r} 32.96 \\ 40.58 \\ \underline{1.39} \\ 74.93 \end{array} \uparrow$$

Think	Record
17, 23	3
5, 10, 19	9
2, 4	4
7	7

SUBTRACTION

$$\begin{array}{r} 26.18 \\ \underline{9.46} \\ 16.72 \end{array} \downarrow$$

Think	Record
8, 2	2
11, 7	7
15, 6	6
1	1

IN ACTION

1. Add. (Remember to line up the decimal points.)

a)	b)	c)	d)	e)	f)	g)
1.14	16.47	1.95	1.28	2.16	8.09	7.35
9.08	12.02	3.42	0.04	0.11	6.10	4.03
0.01	0.02	24.28	2.38	19.16	3.64	15.27

2. Subtract.

a)	b)	c)	d)	e)	f)	g)
6.38	2.01	87.65	0.85	26.38	4.25	13.56
2.09	1.47	29.37	0.29	15.92	1.75	9.73

3. Find the total amount.

a)	b)	c)	d)	e)	f)	g)
$1.36	$0.49	$20.08	$16.63	$17.57	$9.76	$5.37
8.38	3.36	1.49	21.40	12.54	9.87	8.62
4.97	16.87	62.94	1.90	9.89	3.84	0.99
5.06	4.95	0.67	0.06	6.32	6.75	9.04

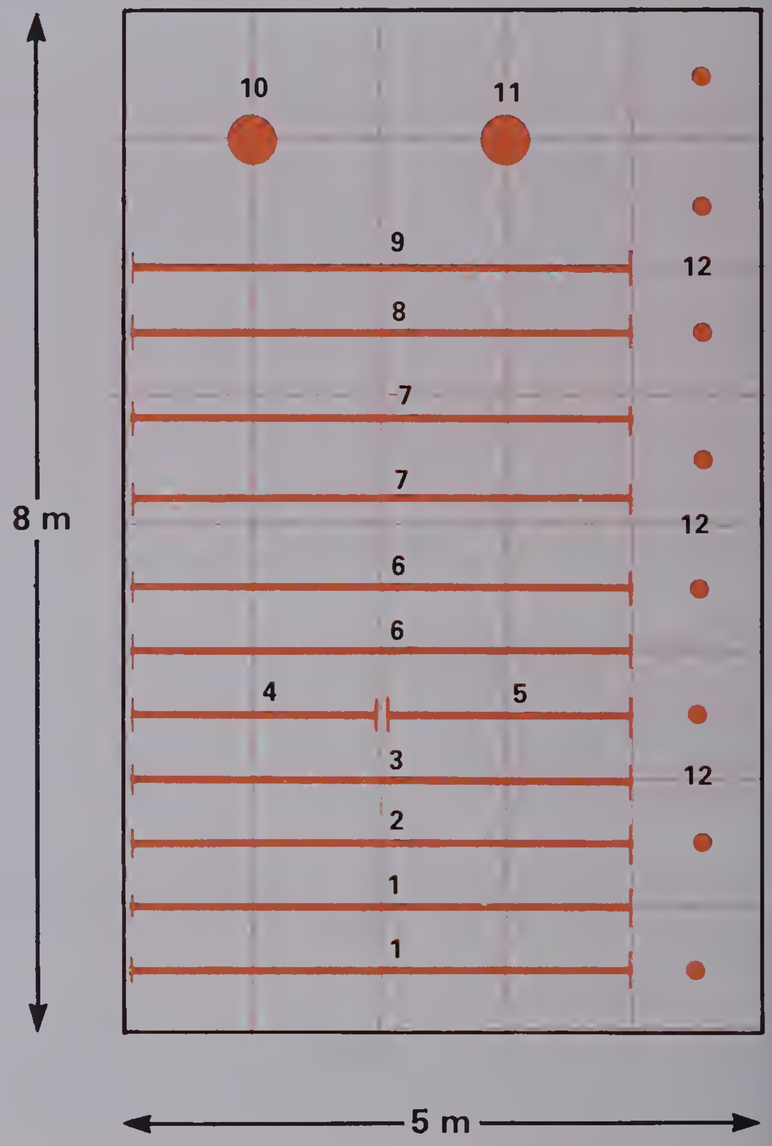
4. Find the difference in amount.

a)	b)	c)	d)	e)	f)	g)
$9.24	$14.12	$6.14	$12.45	$9.62	$8.59	$7.38
3.36	6.64	2.35	7.86	4.75	3.64	5.89

Planting a Vegetable Garden

Miss Johnston's class of 33 students decided to plant a vegetable garden. They dug their garden using tools they borrowed from the custodian, Mr. Medeiros.
What can you tell us about the students' garden?

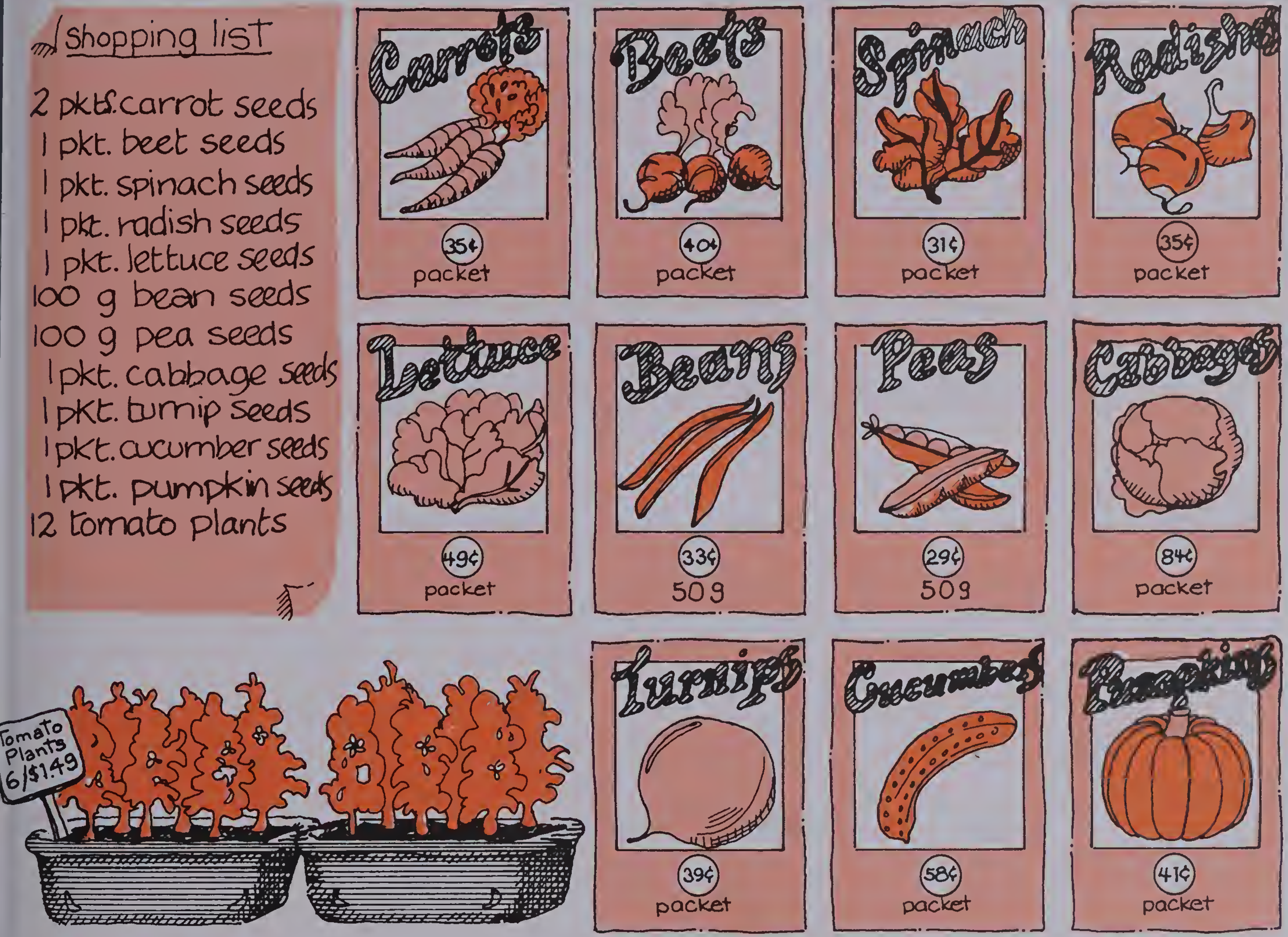
1. How many different kinds of vegetables are they going to plant?
2. What is the perimeter of their garden?
3. What is the area of the garden?
4. What is the length of a row of cabbages?
5. What is the total length of the rows of peas?
6. How many tomato plants are going to be in their garden?
7. They hope to get 10 tomatoes from each plant. If they do, how many tomatoes will each student be able to take home?



LEGEND

1—carrots
2—beets
3—spinach
4—radishes
5—lettuce
6—beans

7—peas
8—cabbages
9—turnips
10—cucumbers
11—pumpkins
12—tomatoes



shopping list

2 pkts. carrot seeds
1 pkt. beet seeds
1 pkt. spinach seeds
1 pkt. radish seeds
1 pkt. lettuce seeds
100 g bean seeds
100 g pea seeds
1 pkt. cabbage seeds
1 pkt. turnip seeds
1 pkt. cucumber seeds
1 pkt. pumpkin seeds
12 tomato plants

Carrots
35¢ packet
Beets
40¢ packet
Spinach
31¢ packet
Radishes
35¢ packet
Lettuce
49¢ packet
Beans
33¢ 50 g
Peas
29¢ 50 g
Cabbages
84¢ packet
Tomato Plants 6/$1.49
Turnips
39¢ packet
Cucumbers
58¢ packet
Pumpkins
41¢ packet

IN ACTION

1. What will each of the following cost?
   a) carrot seeds
   b) bean seeds
   c) pea seeds
   d) tomato plants
   e) all the seeds
   f) all the seeds and the tomato plants
2. What change will the students get from a 10 dollar bill?

Recall Addition and Subtraction

ADDITION

297
485
754
516
2052

Think	Record
10, 15, 22	2
3, 8, 16, 25	5
7, 14, 18, 20	20

SUBTRACTION

$12.50
5.84
$ 6.66

Think	Record
10, 6	6
14, 6	6
11, 6	6

IN ACTION

1. Add.

a)	b)	c)	d)	e)	f)
572	$1.35	419	$53.46	1 697	$13.60
98	0.87	385	95.04	5 619	40.97
319	0.53	728	81.72	2 583	15.06
54	2.17	619	42.67	2 483	8.38

2. Subtract.

a)	b)	c)	d)	e)	f)
$8.01	314	$19.71	843	$23.36	1861
0.05	271	9.94	429	12.48	1287

3. Find the total amounts.

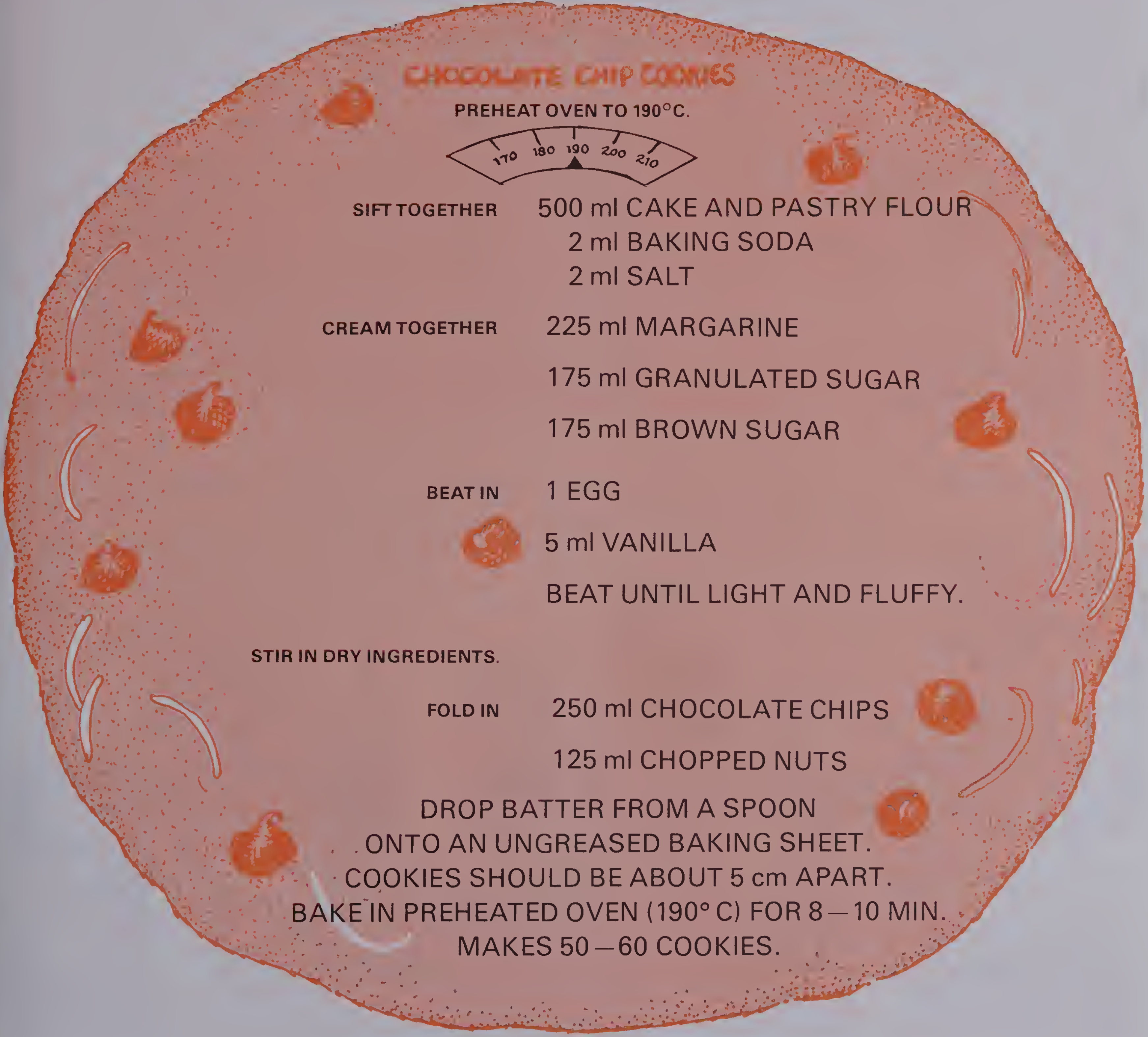
a)	b)	c)	d)	e)	f)
$8.46	$8.75	$0.95	$1.93	$2.24	$4.09
0.79	4.25	1.96	2.24	8.03	26.95
9.04	3.79	6.35	5.76	2.98	3.08
2.07	6.24	5.75	9.38	5.39	17.87

4. Add. Find the difference between the totals in each part.

a)		b)		c)	
252	434	$3.19	$5.61	1963	2473
716	345	9.21	2.87	4194	305
278	894	7.87	6.95	1861	1287
219	436	3.08	4.09	949	3367

A Bake Sale

To raise money for a field trip,
Mr. Norman's class planned a bake sale. The students decided
to bake and sell their favourite cookies.



CHOCOLATE CHIP COOKIES

PREHEAT OVEN TO 190°C.

SIFT TOGETHER 500 ml CAKE AND PASTRY FLOUR
2 ml BAKING SODA
2 ml SALT

CREAM TOGETHER 225 ml MARGARINE
175 ml GRANULATED SUGAR
175 ml BROWN SUGAR

BEAT IN 1 EGG
5 ml VANILLA
BEAT UNTIL LIGHT AND FLUFFY.

STIR IN DRY INGREDIENTS.

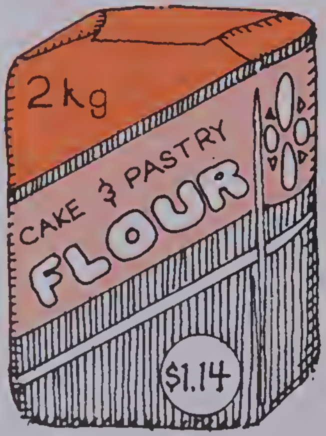
FOLD IN 250 ml CHOCOLATE CHIPS
125 ml CHOPPED NUTS

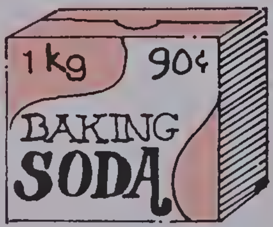
DROP BATTER FROM A SPOON
ONTO AN UNGREASED BAKING SHEET.
COOKIES SHOULD BE ABOUT 5 cm APART.
BAKE IN PREHEATED OVEN (190° C) FOR 8—10 MIN.
MAKES 50—60 COOKIES.

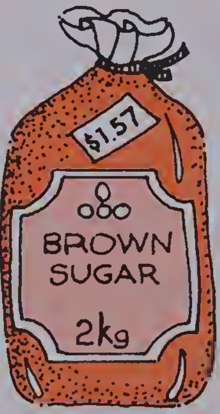
A. The students decided they needed to make 10 times the quantity suggested by the recipe. Help them figure out the amounts needed.

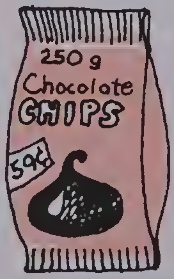
INGREDIENT	RECIPE AMOUNT	× 10	NEEDED AMOUNT
Cake and Pastry Flour	500 ml	× 10	? ml or ? ℓ
Baking Soda	2 ml	× 10	? ml
Salt	2 ml	× 10	? ml
Margarine	225 ml	× 10	? ml or ? ℓ
Granulated Sugar	175 ml	× 10	? ml or ? ℓ
Brown Sugar	175 ml	× 10	? ml or ? ℓ
Eggs	1	× 10	?
Vanilla	5 ml	× 10	? ml
Chocolate Chips	250 ml	× 10	? ml or ? ℓ
Chopped Nuts	125 ml	× 10	? ml or ? ℓ

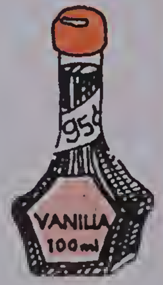
B. To find out how much money they would need, the students first checked the newspaper.

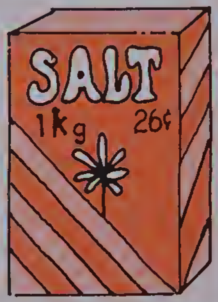

2 kg
CAKE & PASTRY
FLOUR
$1.14

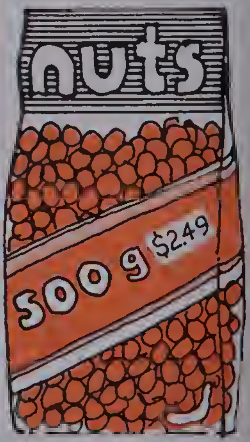

1 kg
90¢
BAKING
SODA

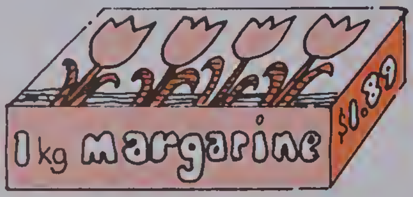

$1.57
BROWN
SUGAR
2 kg

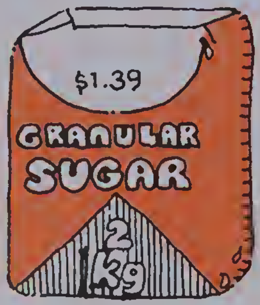

250 g
Chocolate
CHIPS
59¢

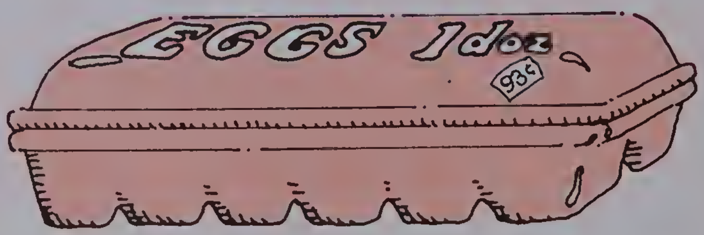

95¢
VANILLA
100 ml




nuts
500 g
$2.49


1 kg margarine
$1.89


$1.39
GRANULAR
SUGAR
2 kg


EGGS 1 doz
93¢

C. Next they figured out
the cost of each ingredient needed.
Help them.

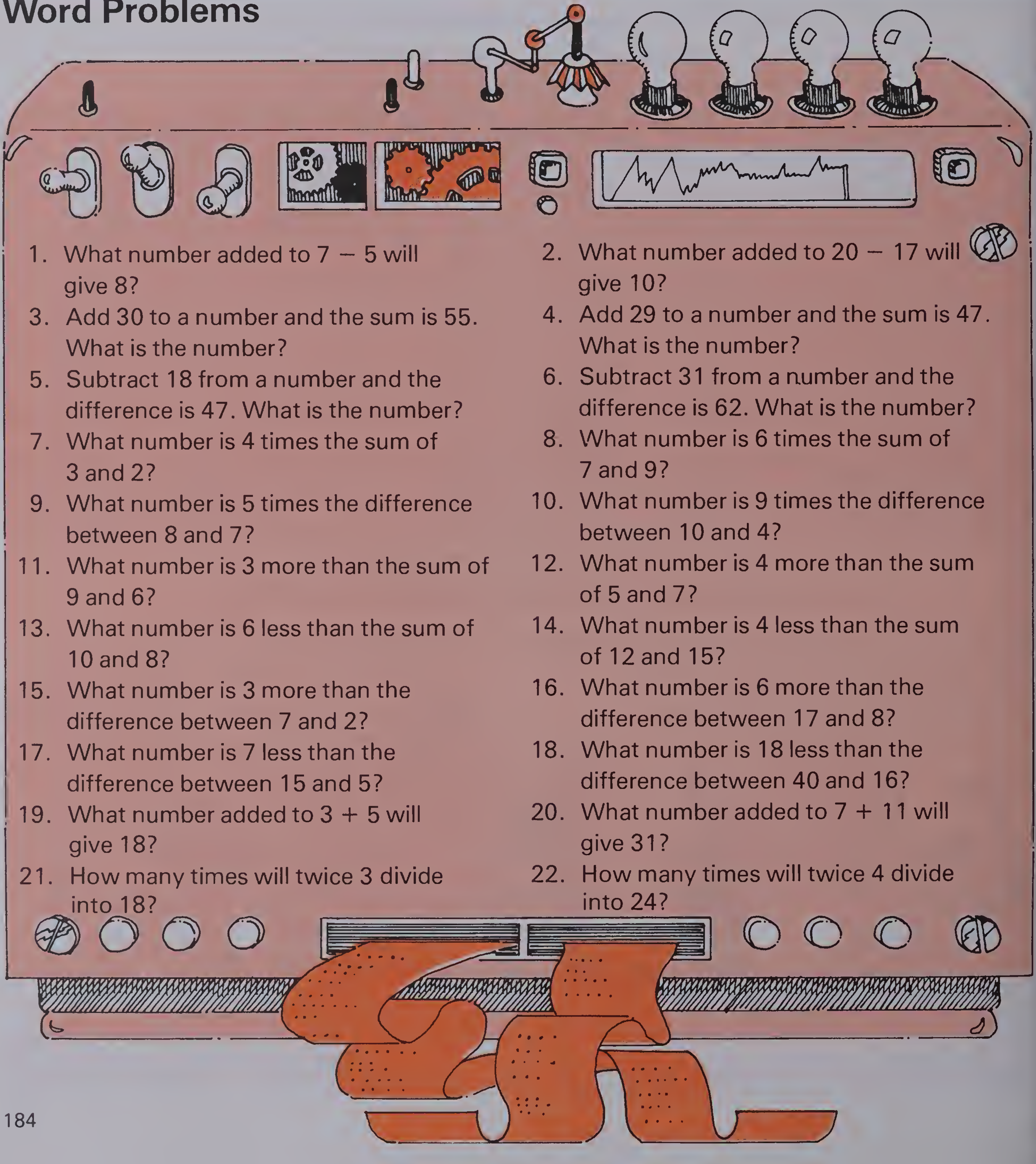
INGREDIENT	QUANTITY		COST
Cake and pastry flour	2 bags	2 × $1.14	?
Baking soda	1 can	1 × $0.90	$0.90
Salt	1 box	1 × ?	?
Margarine	2 kg	2 × ?	?
Granulated sugar	1 box	1 × ?	?
Brown sugar	1 bag	?	?
Eggs	1 dozen	?	?
Vanilla	1 bottle	?	?
Chocolate chips	4 bags	?	?
Chopped nuts	1 bag	?	?

1. What is the total cost of all the ingredients?
2. How much change will the students receive from a 20 dollar bill?

D. When they had finished baking the cookies, they found they had 500 altogether. They decided to sell the cookies for 59¢ for a bag of 10.

1. How much money would they take in if they sold them all?
2. What would their profit be? (Remember how much they had paid for the ingredients.)

Word Problems



1. What number added to 7 − 5 will give 8?
2. What number added to 20 − 17 will give 10?
3. Add 30 to a number and the sum is 55. What is the number?
4. Add 29 to a number and the sum is 47. What is the number?
5. Subtract 18 from a number and the difference is 47. What is the number?
6. Subtract 31 from a number and the difference is 62. What is the number?
7. What number is 4 times the sum of 3 and 2?
8. What number is 6 times the sum of 7 and 9?
9. What number is 5 times the difference between 8 and 7?
10. What number is 9 times the difference between 10 and 4?
11. What number is 3 more than the sum of 9 and 6?
12. What number is 4 more than the sum of 5 and 7?
13. What number is 6 less than the sum of 10 and 8?
14. What number is 4 less than the sum of 12 and 15?
15. What number is 3 more than the difference between 7 and 2?
16. What number is 6 more than the difference between 17 and 8?
17. What number is 7 less than the difference between 15 and 5?
18. What number is 18 less than the difference between 40 and 16?
19. What number added to 3 + 5 will give 18?
20. What number added to 7 + 11 will give 31?
21. How many times will twice 3 divide into 18?
22. How many times will twice 4 divide into 24?

Retrace Your Steps

1. POPULATION OF CITIES

Rio de Janeiro	7 094 211	Sao Paulo	8 062 130	New Delhi	3 647 023
Paris	8 196 746	Hamburg	1 817 100	Buenos Aires	8 352 900
Amsterdam	1 049 113	Montreal	2 743 208	New York	9 943 800

a) List the cities in order of population from greatest to least.

b) What is the value of each of the coloured digits?

c) Approximately how many times greater is the population of Paris than that of Amsterdam?

d) Approximately how many times greater is the population of Buenos Aires than that of New Delhi?

e) Draw and complete a place value chart for the populations of Rio de Janeiro, Sao Paulo and Montreal.

f) Write the expanded form for the populations of Hamburg and New York.

2. Express using exponents.

a) 5×5 b) $3 \times 3 \times 3 \times 3$ c) $10 \times 10 \times 10$

d) $4 \times 4 \times 4 \times 4 \times 4$ e) $2 \times 2 \times 2 \times 2 \times 2 \times 2$

3. Express using factors.

a) 3^4 b) 5^2 c) 9^3 d) 10^5 e) 2^7 f) 3^6 g) 4^8 h) 1^6

4. Find the values.

a) 3^4 b) 9^2 c) 2^8 d) 10^5 e) 7^3 f) 4^5 g) 5^4 h) 6^1

5. Add.

a) 436	b) 87.6	c) \$7.64	d) 5.87	e) \$17.84	f) 19.04
29	3.4	0.38	3.49	3.97	49.80
147	9.6	0.49	0.74	0.49	30.97
16	10.8	6.53	1.56	3.87	51.24

6. Subtract.

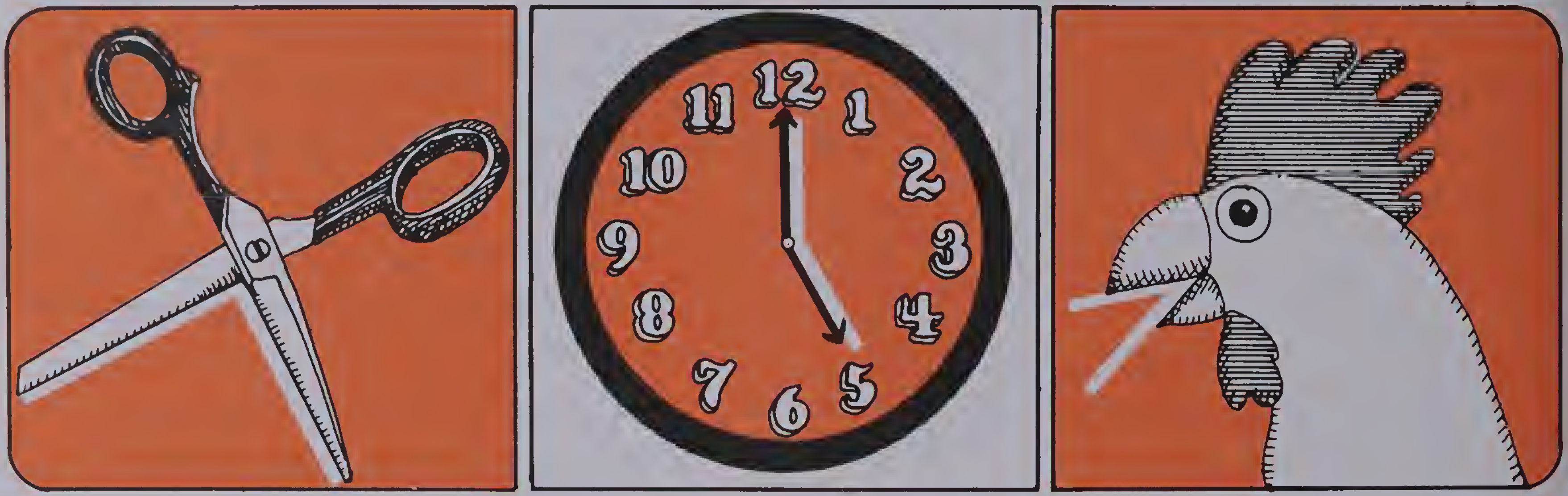
a) 4876	b) \$14.87	c) 426.1	d) \$60.40	e) 36.40	f) 741.8
1939	9.58	149.3	39.87	15.08	409.0

7. List A: \$0.68, \$6.49, \$2.56, \$7.56, \$0.98
List B: \$1.56, \$4.52, \$0.59, \$3.56, \$0.39
What is the difference between the totals of list A and list B?

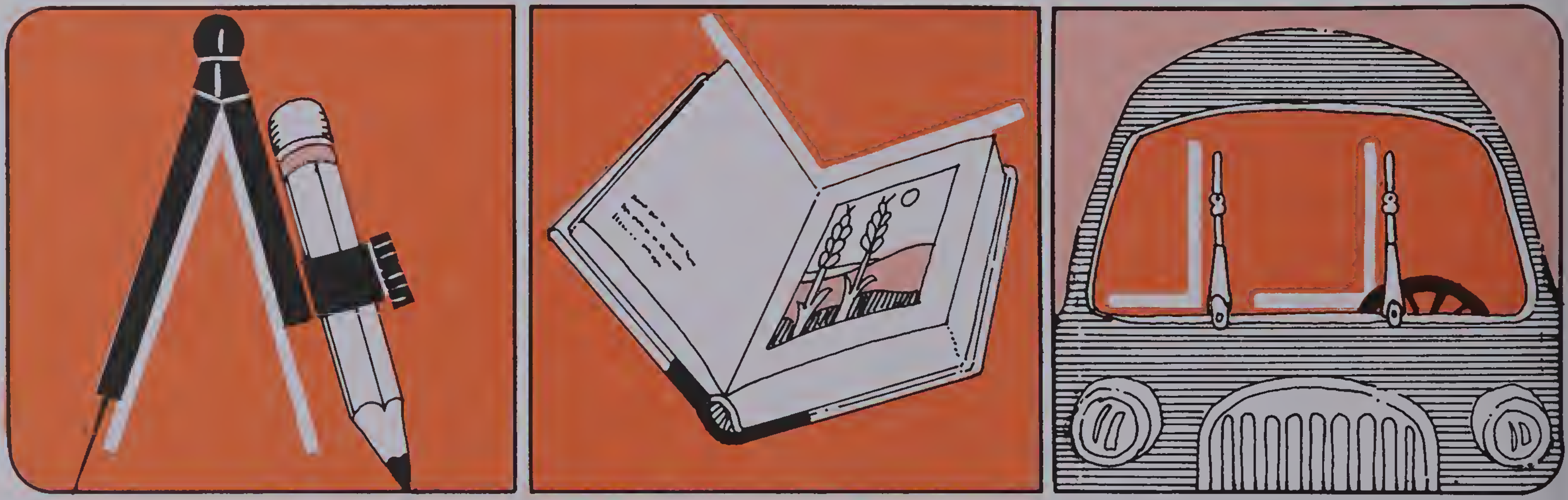
EXPLORE

ANGLES

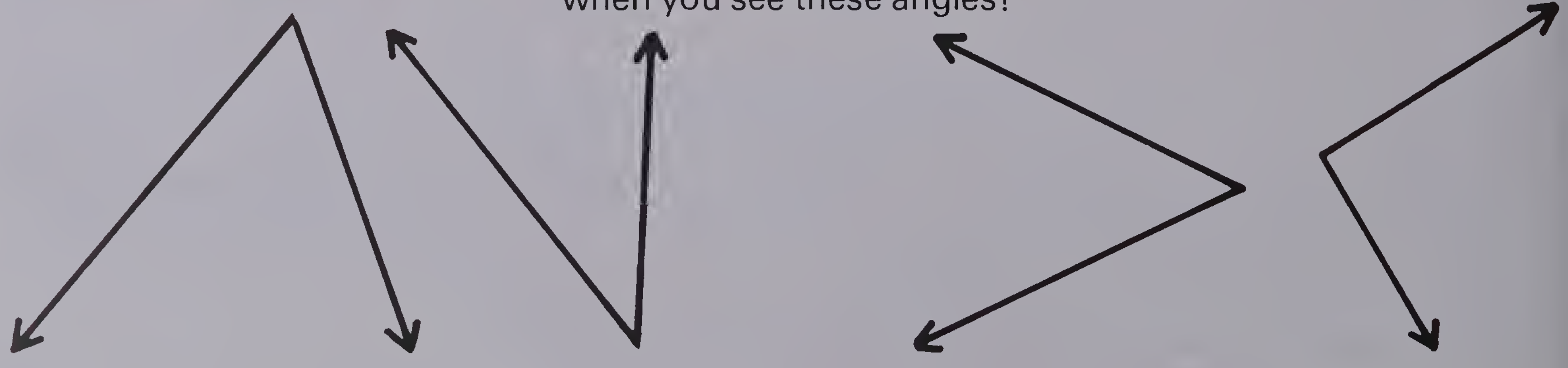
We can see angles in these pictures.


12
1
2
3
4
5
6
7
8
9
10
11

Draw the angles you see here.

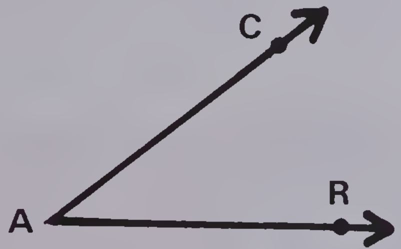


What objects are you reminded of
when you see these angles?

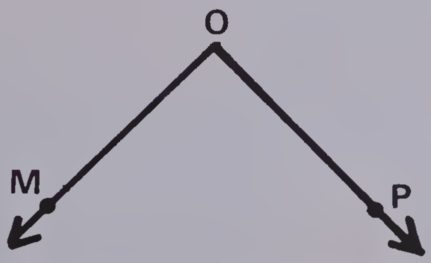


Naming Angles

We can use any 3 capital letters to name an angle.

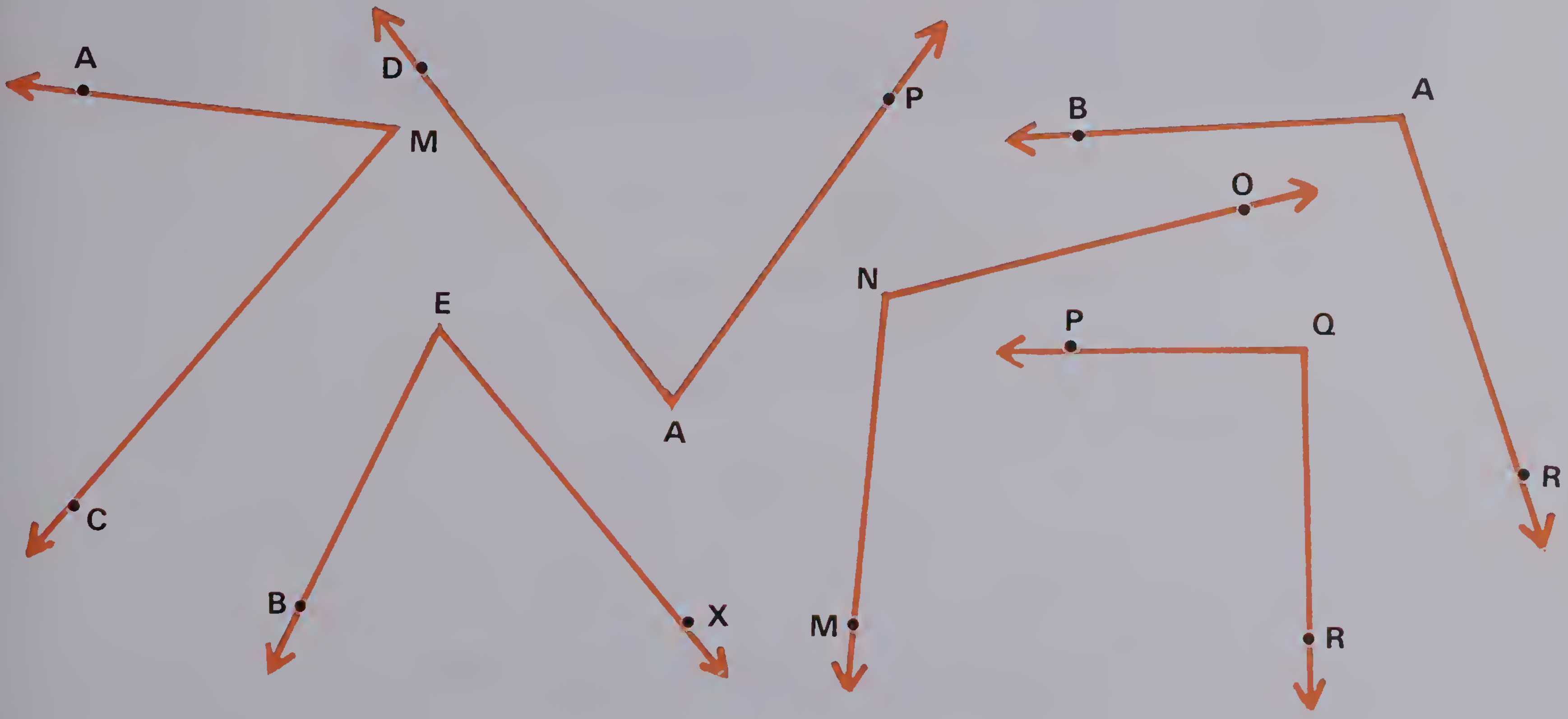


This is ∠ CAR or ∠ RAC.
The symbol ∠ means angle.



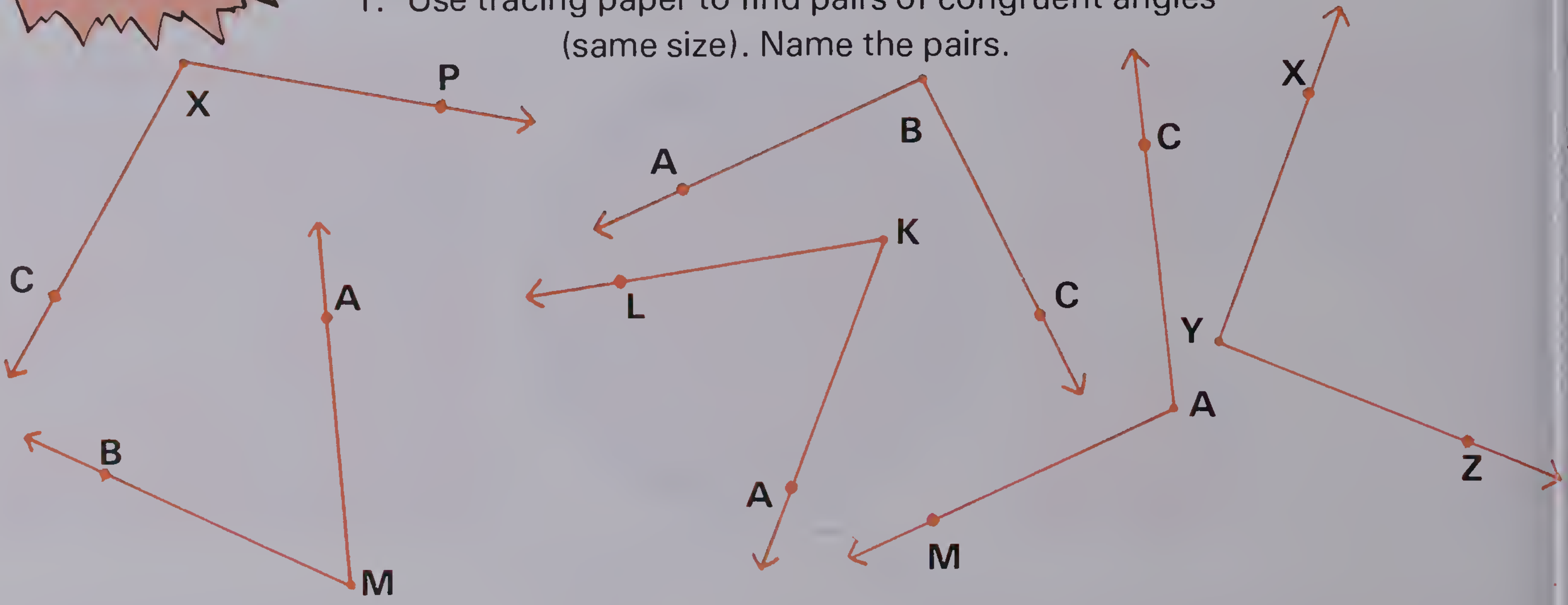
This is ∠ MOP (angle MOP) or ∠ POM.

Name these angles 2 ways.

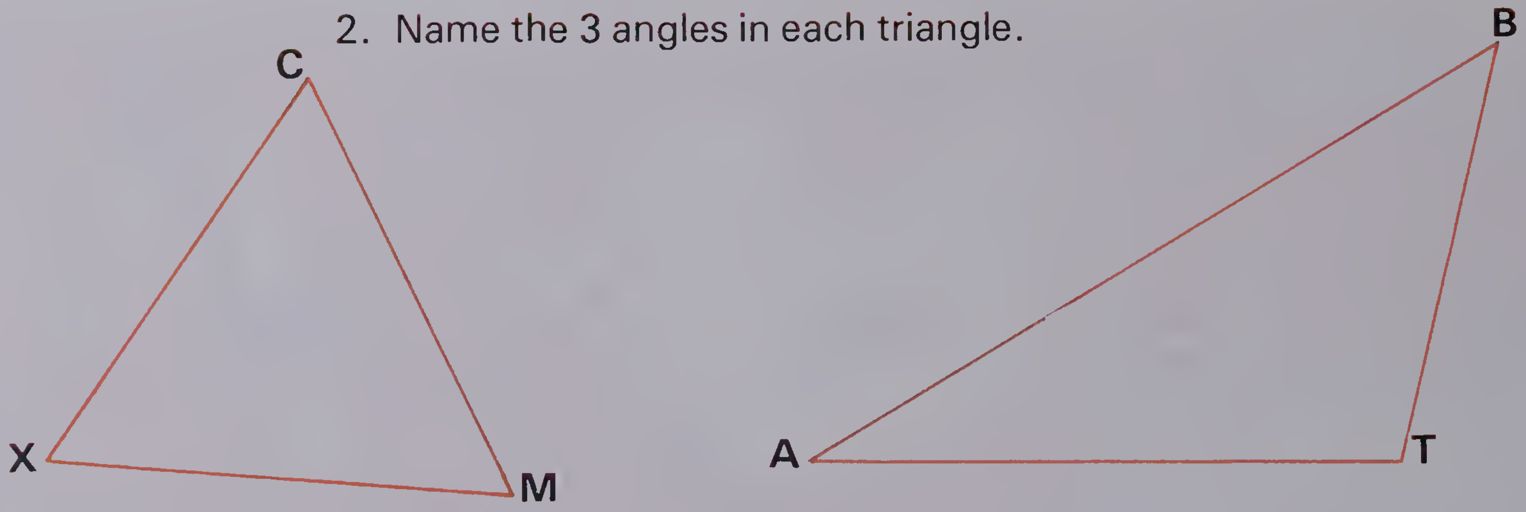

A
D
M
P
B
A
O
N
E
A
P
Q
R
C
B
X
M
R

IN ACTION

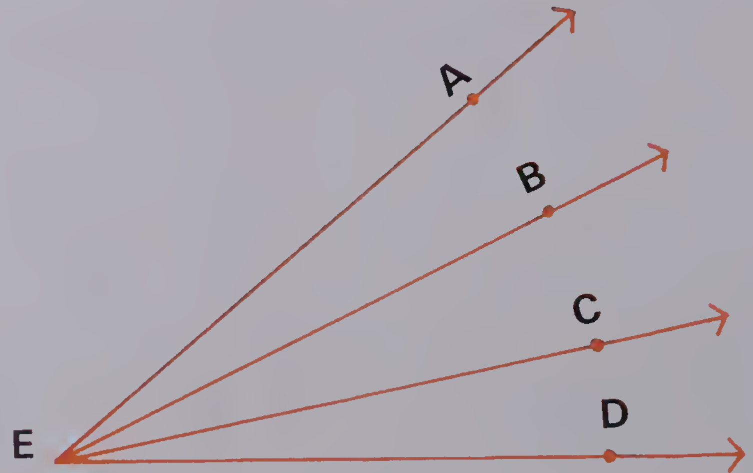
1. Use tracing paper to find pairs of congruent angles (same size). Name the pairs.


X
P
C
A
B
M
A
B
C
K
L
A
C
Y
A
M
X
Z

2. Name the 3 angles in each triangle.

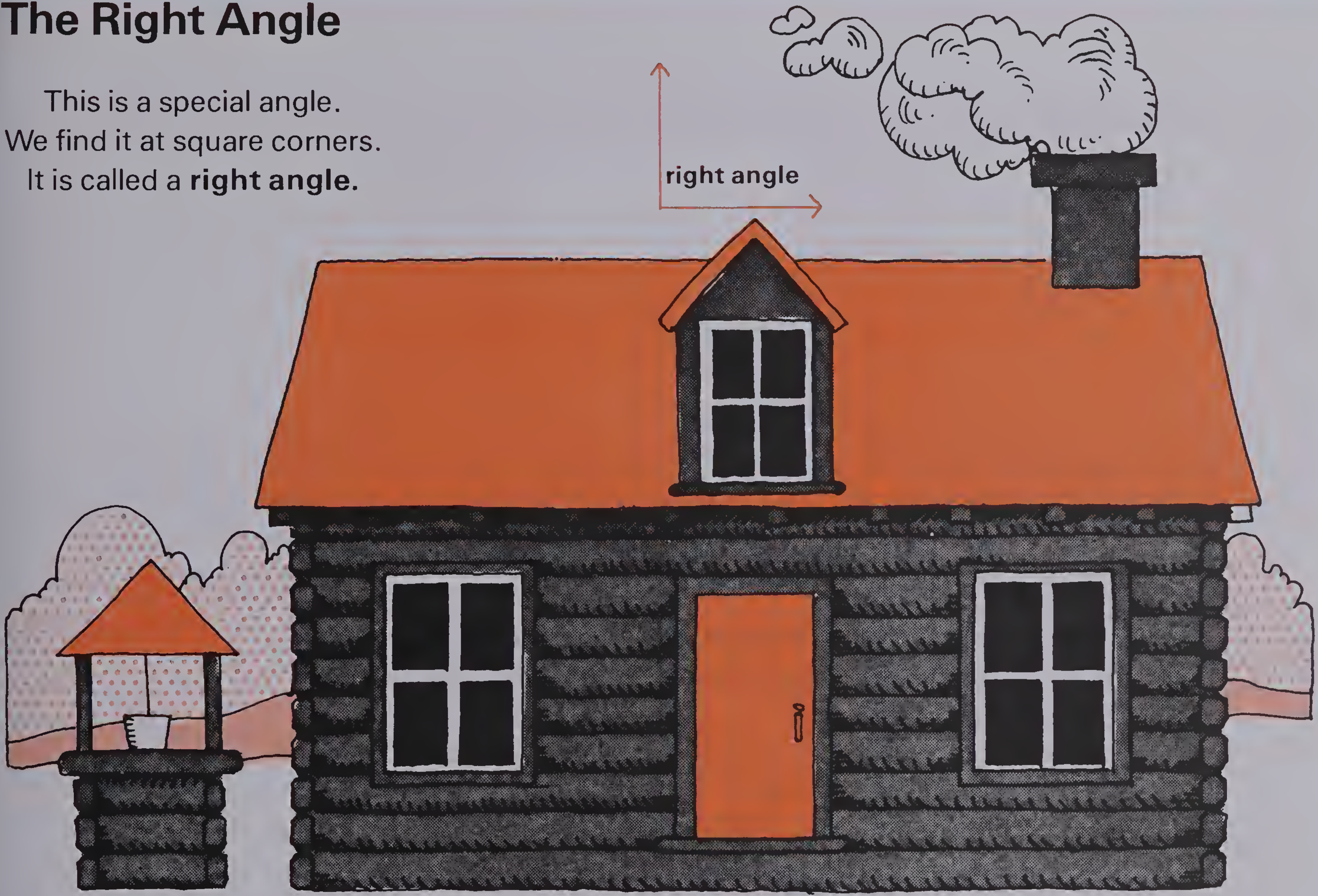


3. Trace and name 6 different angles.

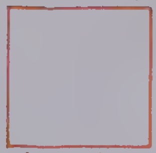


The Right Angle

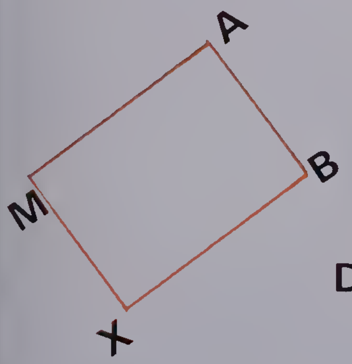
This is a special angle.
We find it at square corners.
It is called a **right angle.**

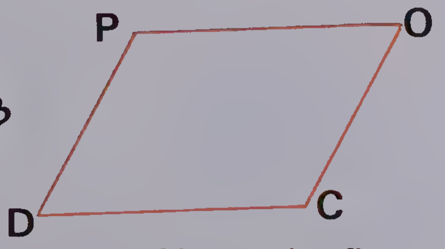

right angle

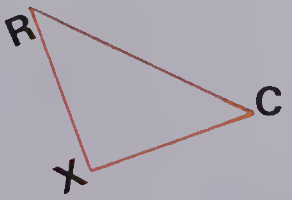
Where do you see right angles in this picture?
How many do you see?

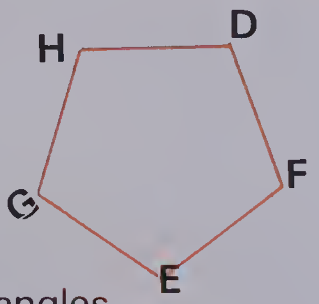


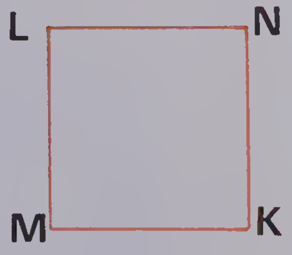
How many right angles do you see in a square?



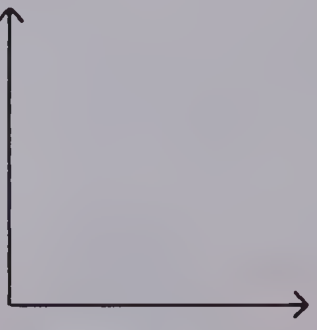




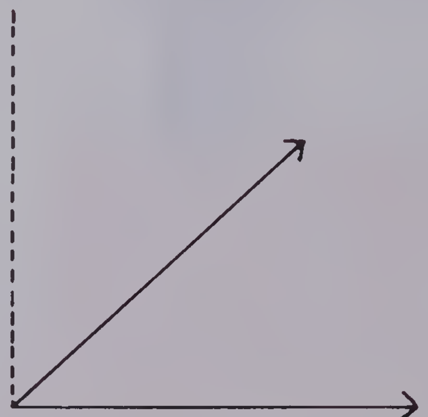




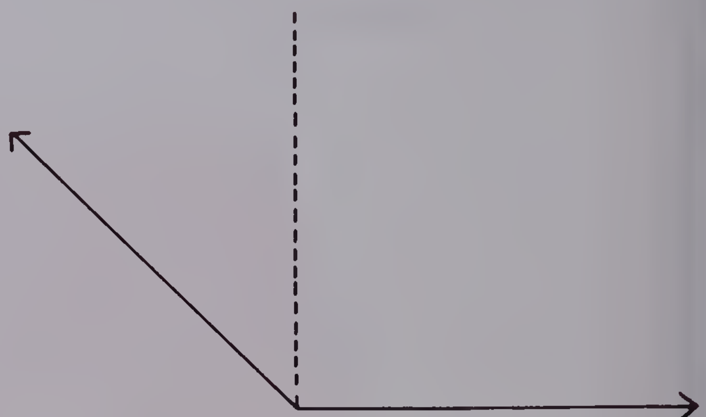
Name the figures that contain right angles.
Name the right angles.



right angle



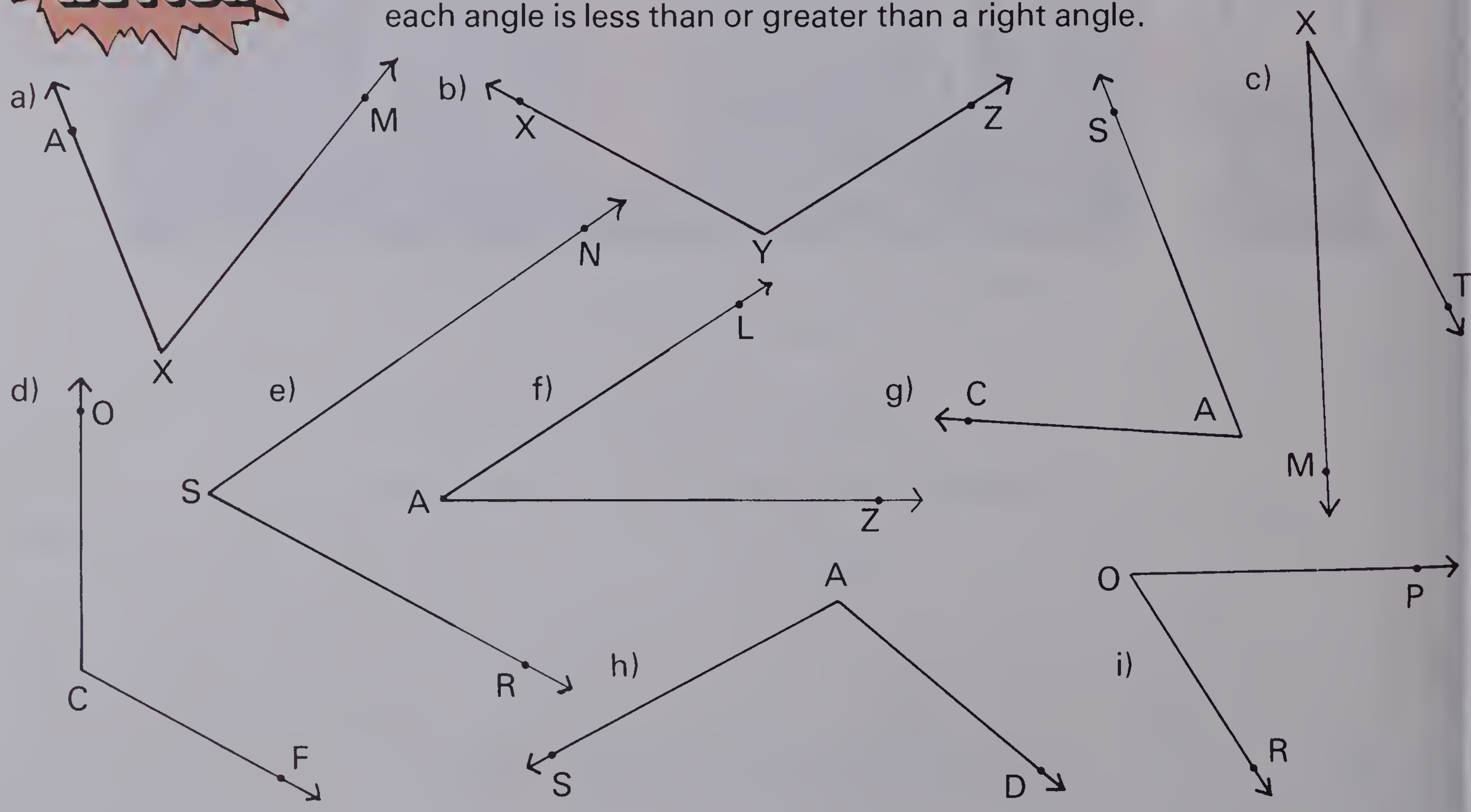
This angle is less than a right angle.



This angle is greater than a right angle.

IN ACTION

1. Trace the right angle. Use your tracing to tell whether each angle is less than or greater than a right angle.


a)
A
M
X
b)
X
Y
Z
c)
X
T
M
d)
O
C
F
e)
N
S
R
f)
L
A
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g)
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C
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h)
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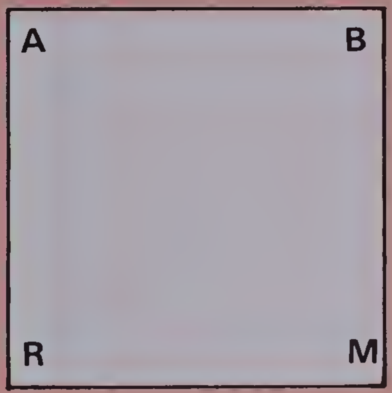
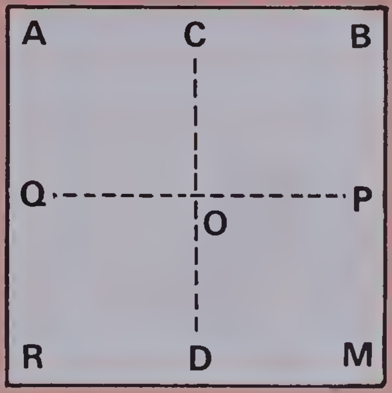
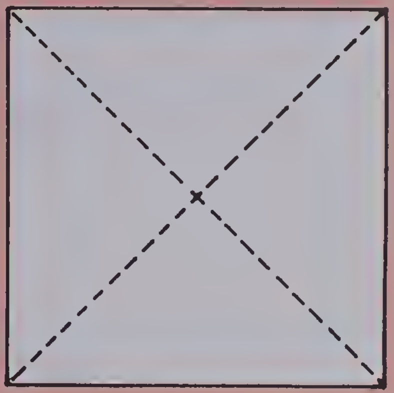
D
i)
O
P
R







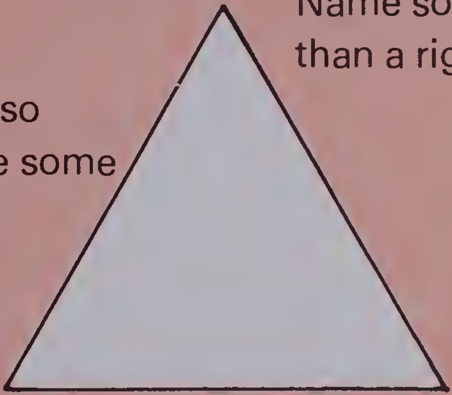
2. Cut out a square shape. Name each vertex. Write the names of the right angles.

3. Fold your square like this. Name the centre O. Write the names of the right angles you see now.

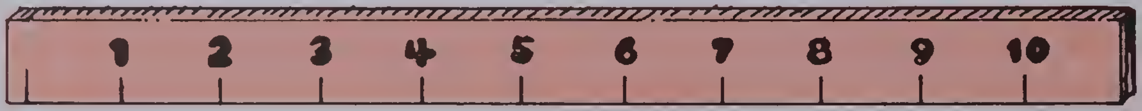
4. Fold another square like this. Name the vertices MNOP and the centre K. Write the names of the right angles you see. Name some angles less than a right angle.

5. Fold a rectangle so that you create some angles greater than a right angle.

6. Fold a triangle so that you create some right angles.



Measuring Angles


1
2
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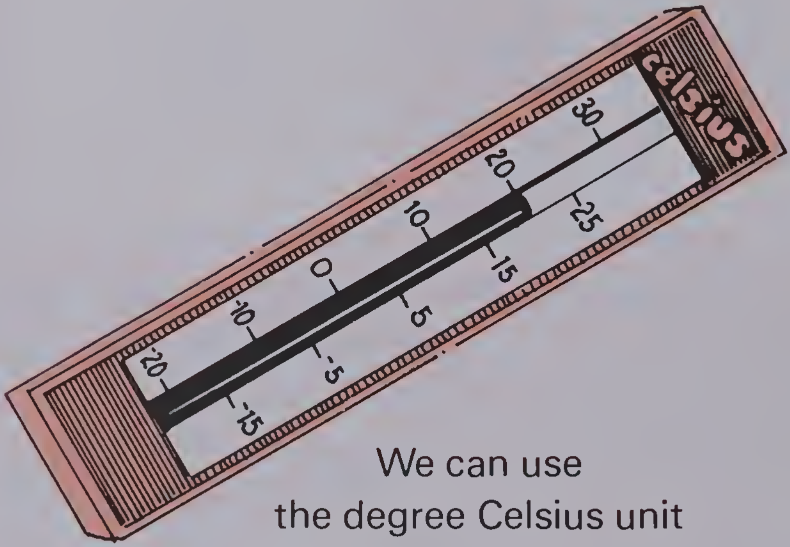
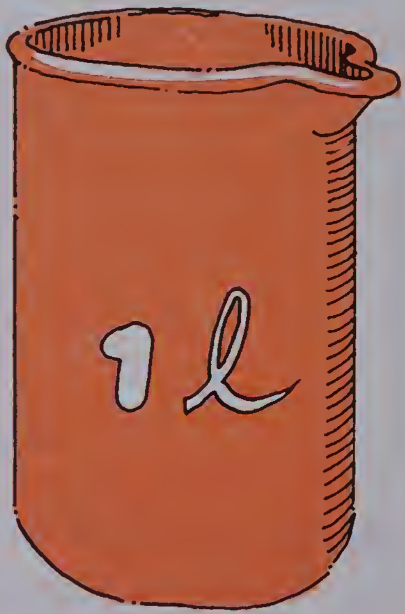
10

We can use the centimetre
as a unit to measure length.

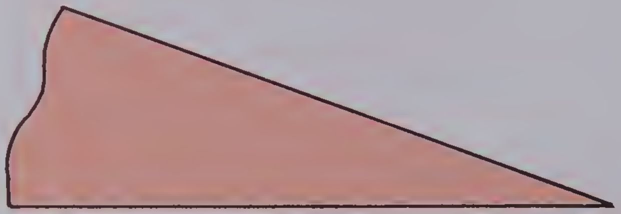

celsius
30
20
10
0
10
20
25
15
5
5
15

We can use
the degree Celsius unit
to measure temperature.

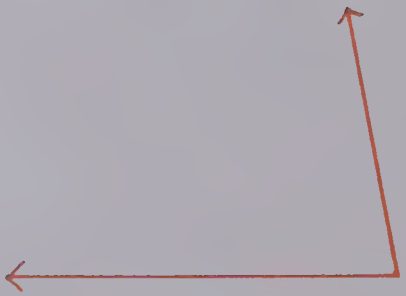


We can use the litre
as a unit to measure liquids.

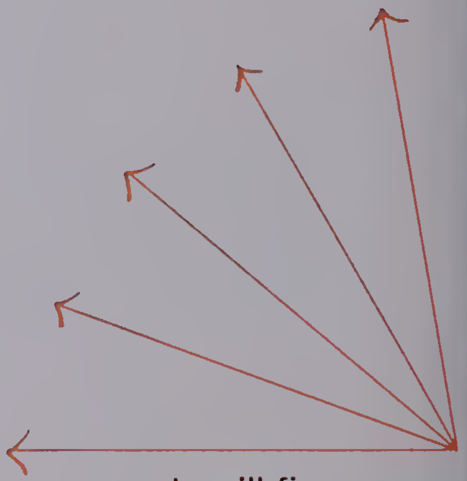
We can measure angles too!



We could use
a unit like this.
Trace and cut out the unit.

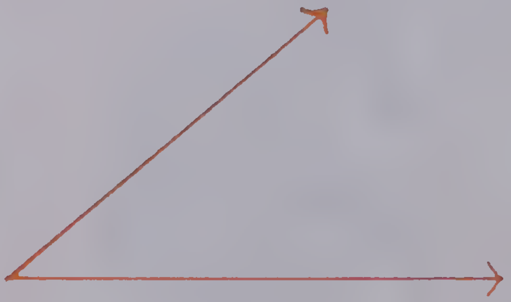


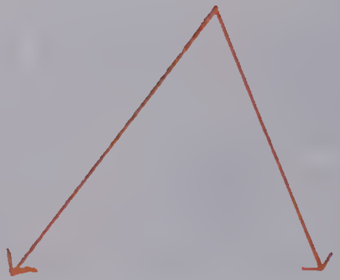
How many times will
the unit fit in this angle?

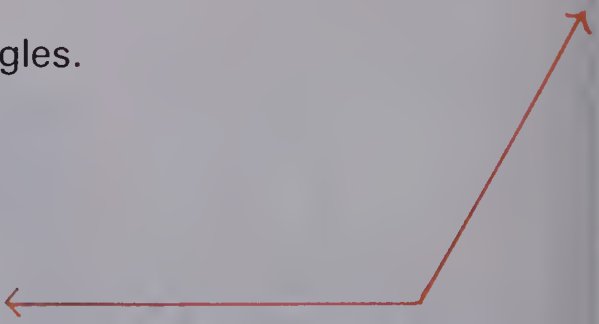


It will fit
4 times.

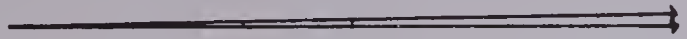
Use your unit to measure these angles.



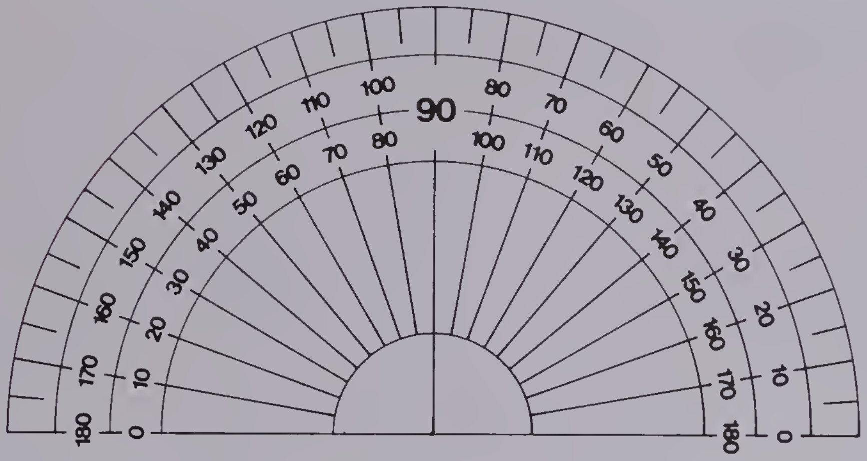




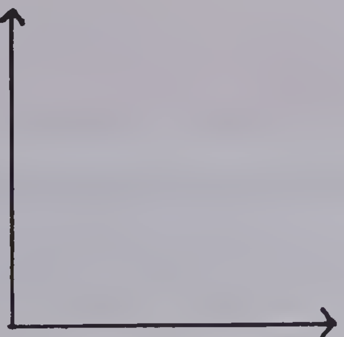
The unit we use for measuring angles is one degree (1°).



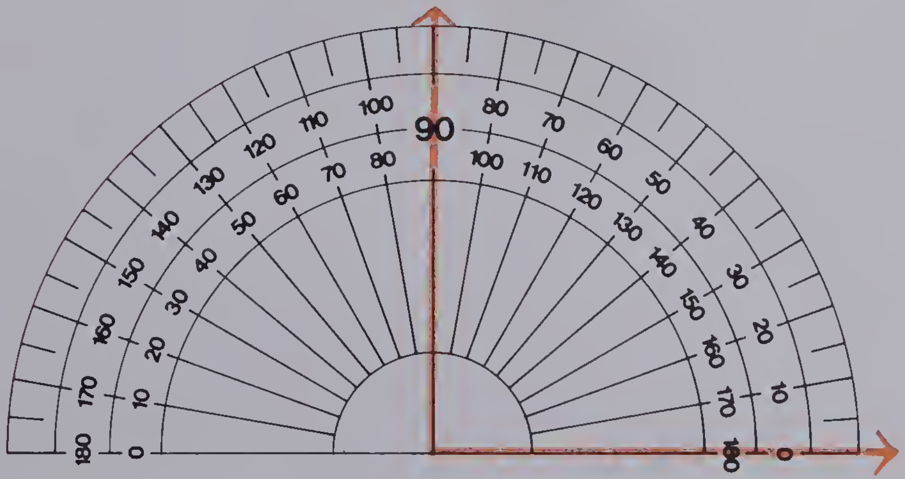
The measurement of this angle is one **degree** (1°).


90
0
10
20
30
40
50
60
70
80
100
110
120
130
140
150
160
170
180

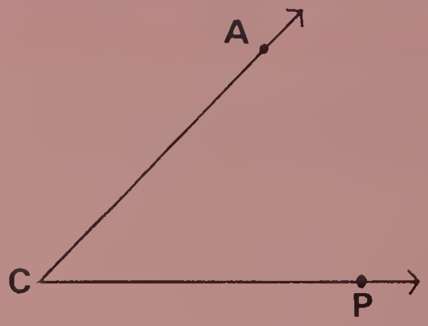
We use a **protractor** to measure angles.
A protractor is marked in degrees.



How many degrees are in a right angle?

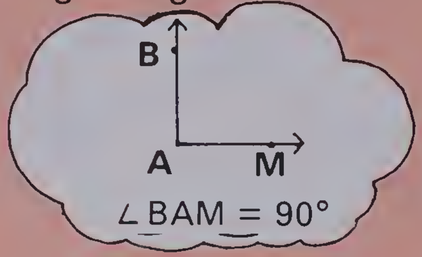

90
0
10
20
30
40
50
60
70
80
100
110
120
130
140
150
160
170
180

The measurement of this angle is 90° (90 degrees).
A right angle is 90°.

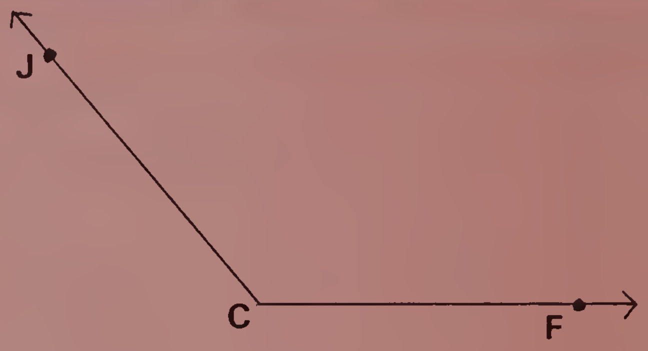


Is this angle greater than
or less than 90°?

To help you decide, think about
a right angle.

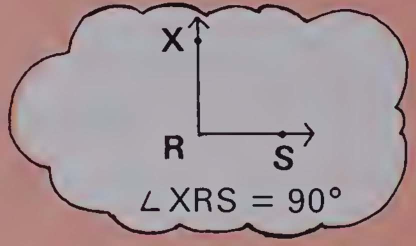


∠ACP is less than 90°.



Is this angle greater than
or less than 90°?

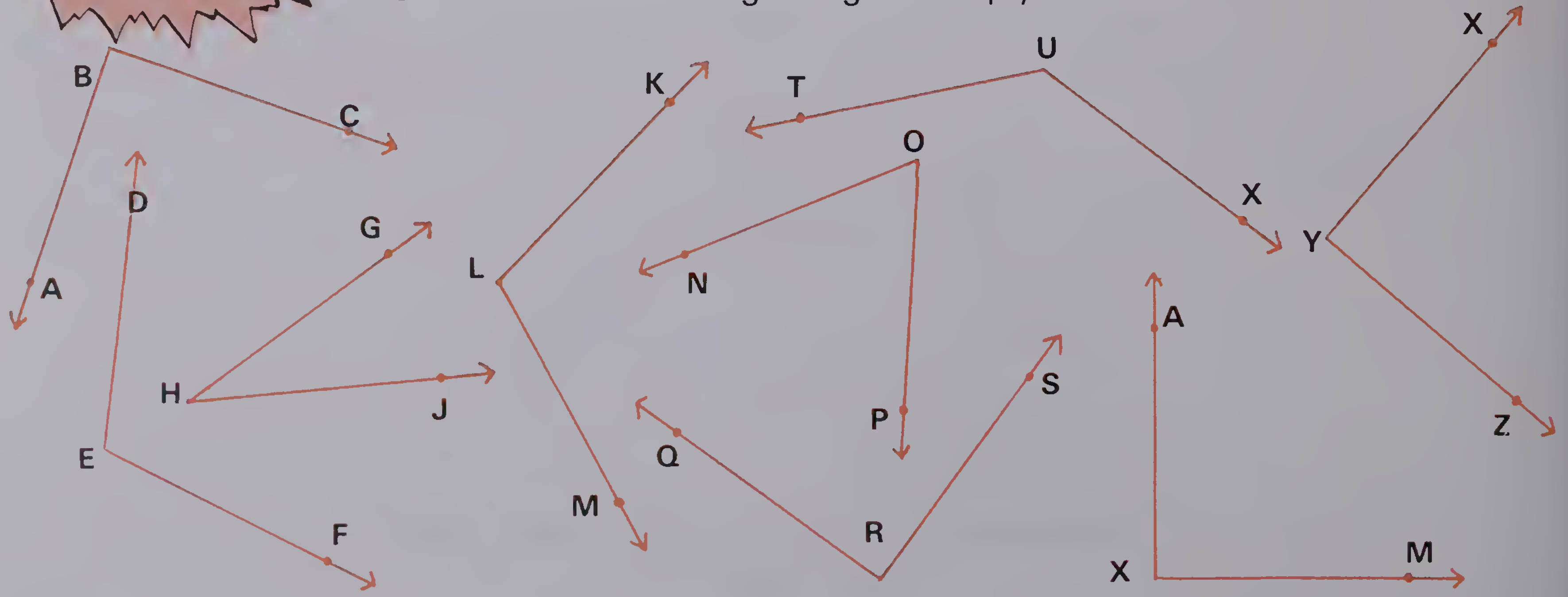
To help you decide, think about
a right angle.



∠JCF is greater than 90°.

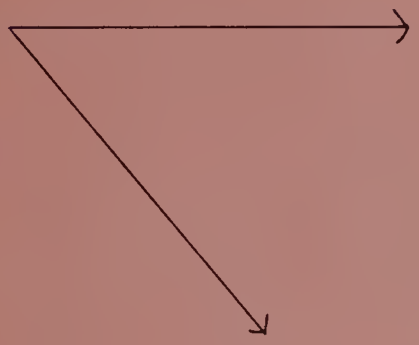
IN ACTION

Tell whether each angle is greater than,
is less than, or is a right angle.
Cut out a model of a right angle to help you decide.


B
C
A
D
G
H
J
E
F
K
L
M
T
U
O
N
X
Y
X
Z
P
Q
R
S
A
X
M

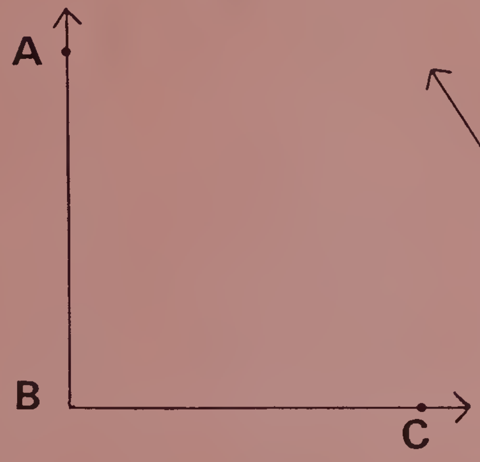
Acute, Obtuse, and Right Angles

Angles less than 90° are called **acute** angles.



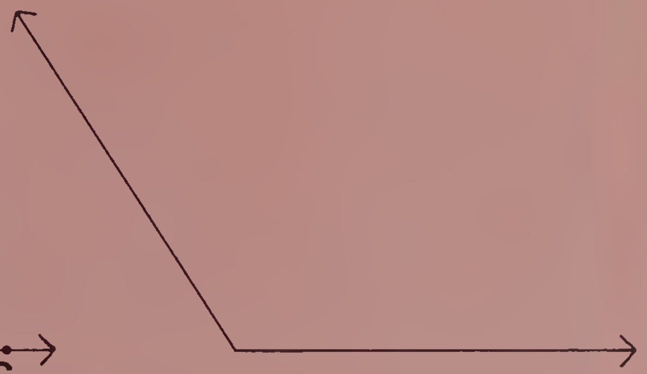
acute angle

∠ ABC = 90°



right angle

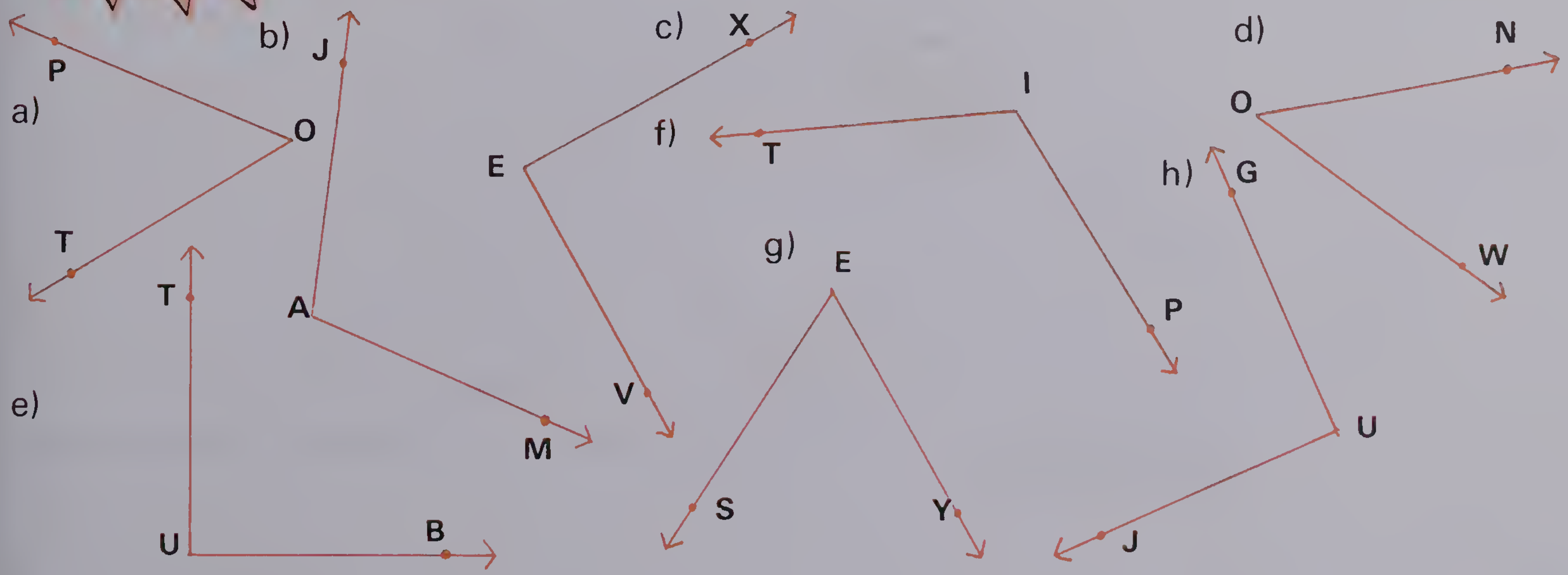
Angles greater than 90° are called **obtuse** angles.



obtuse angle

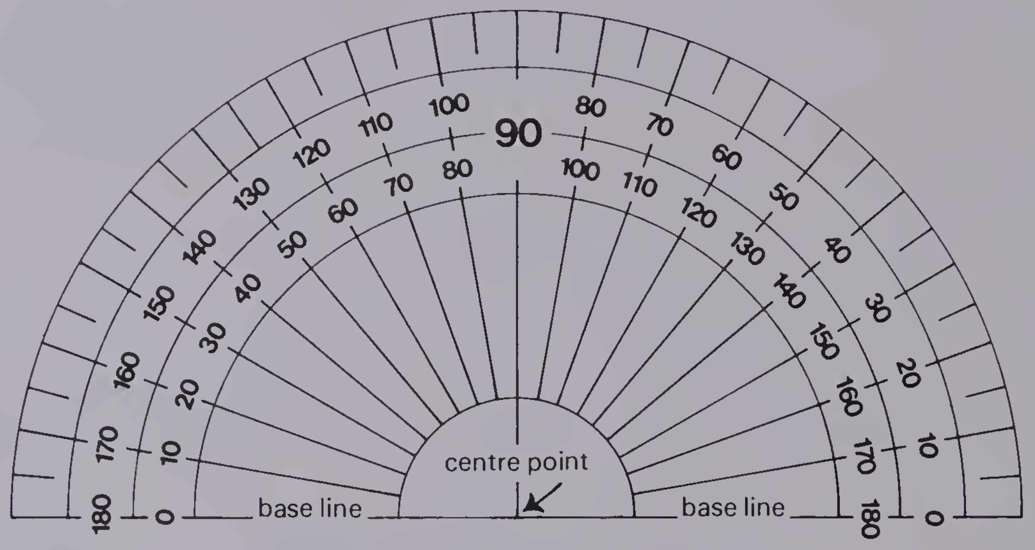
IN ACTION

Tell whether each angle is an acute angle, a right angle, or an obtuse angle. Cut out or trace a 90° angle to help you decide.


a)
P
O
T
b)
J
A
M
c)
X
E
V
d)
N
O
W
e)
T
U
B
f)
I
T
P
g)
E
S
Y
h)
G
U
J

Using A Protractor

Examine your protractor.
Find the centre point and the base line.

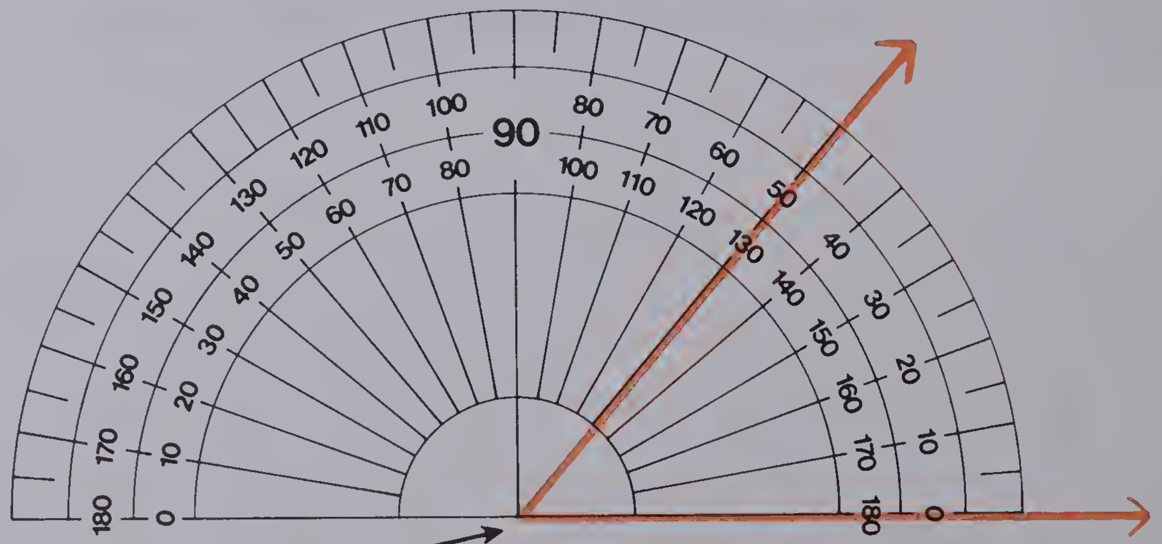


To measure an angle, you must do 3 things.

Step 1
Make sure the centre point of the protractor is on the vertex of the angle to be measured.

Step 2
Make sure that 1 arm of the angle is on the base line of the protractor.

Step 3
Decide which measurement is the correct one.



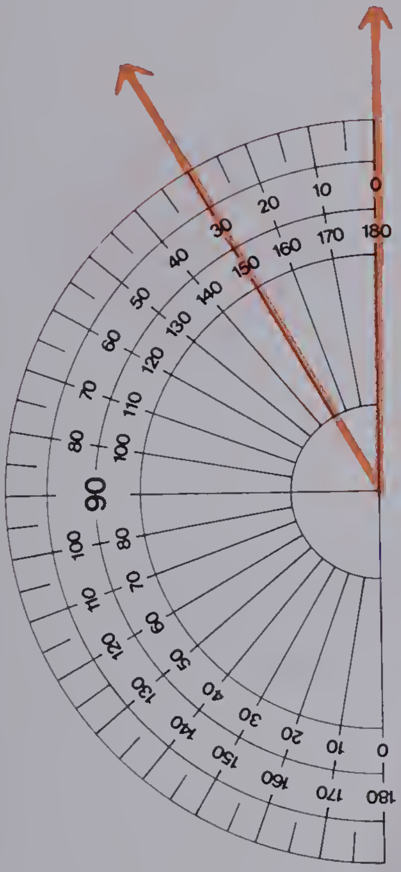
Angle vertex is on the centre point.

One angle arm is on the base line of the protractor.

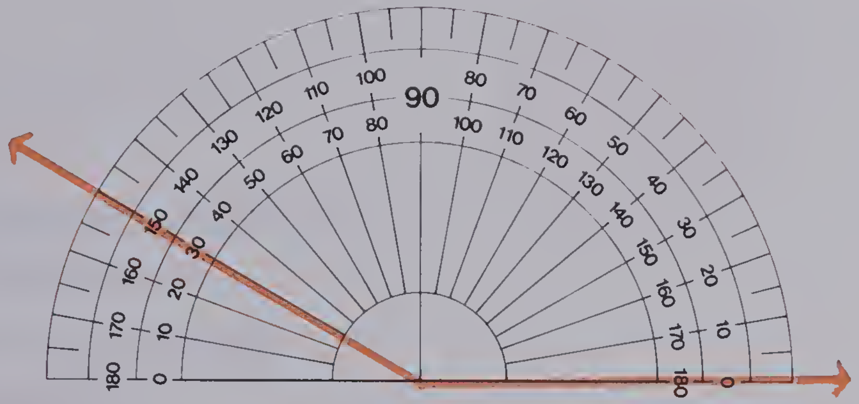
Steps 1 and 2

Check to make sure that the protractor has been correctly placed to measure each angle.

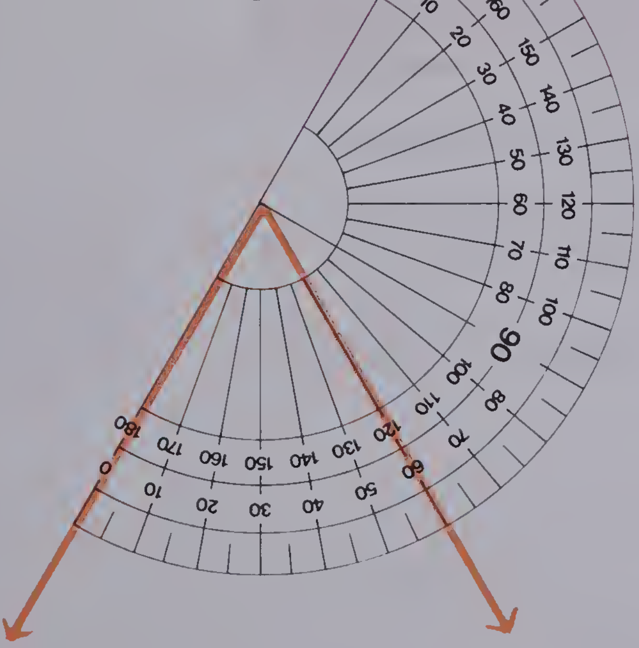
a)



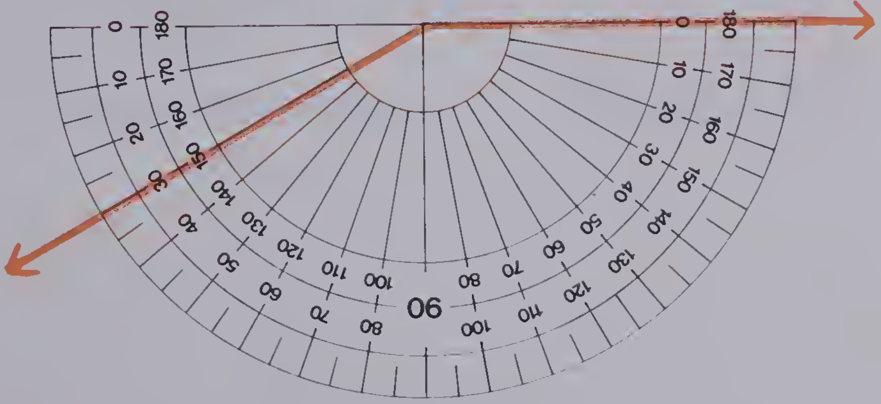
b)



c)

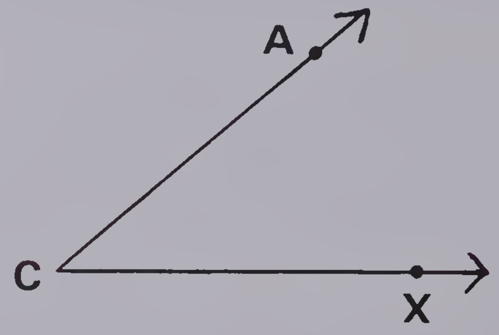


d)

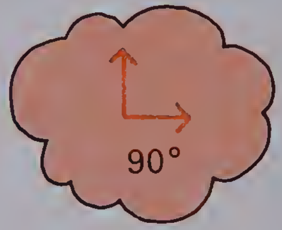


Step 3

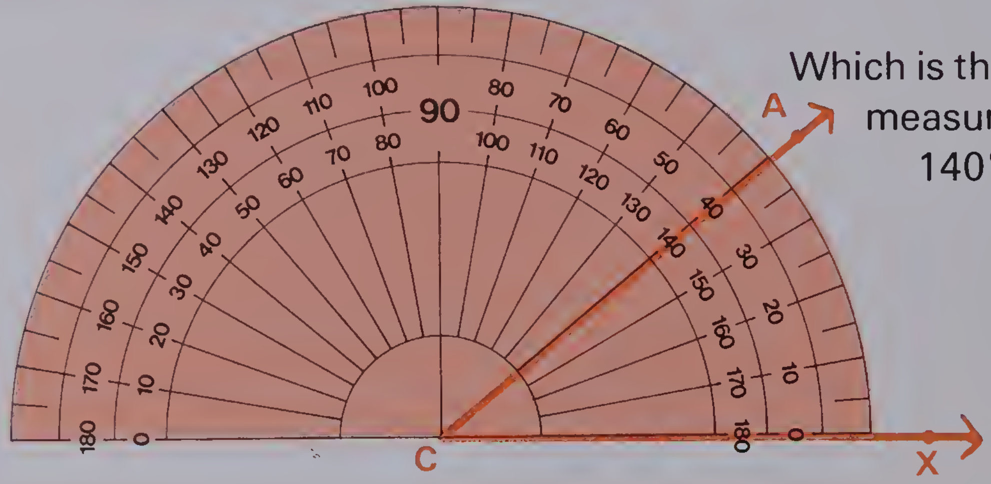
What is the measurement of ∠ ACX?



First decide whether the angle is greater than or less than 90°.

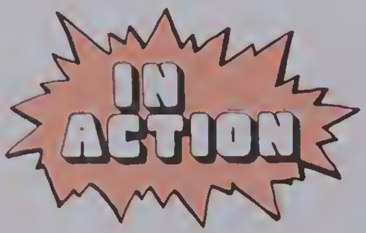


Place your protractor on the angle.



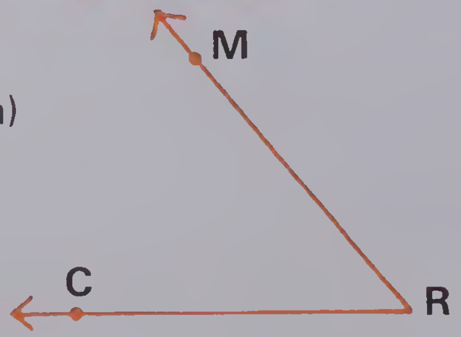
Which is the correct measurement — 140° or 40°?

Because the angle is less than 90°, we know ∠ ACX = 40°.
Read the measurement on the protractor from 0° to 40°.



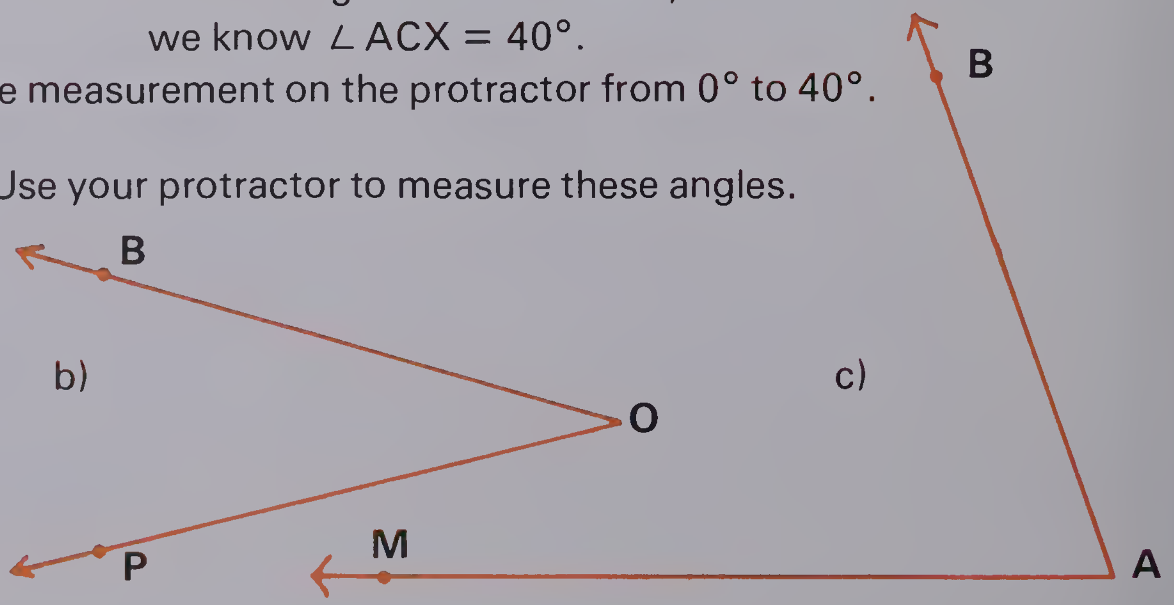
1. Use your protractor to measure these angles.

a)

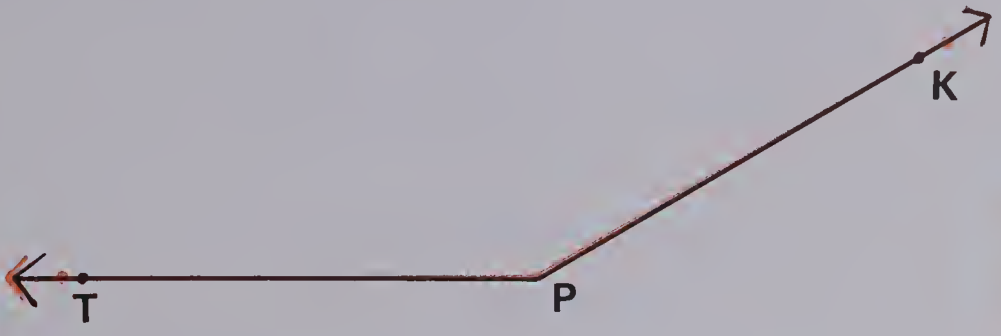


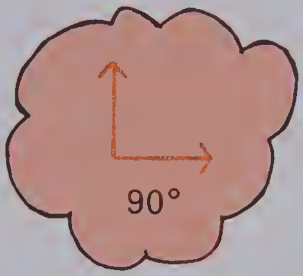
b)

c)



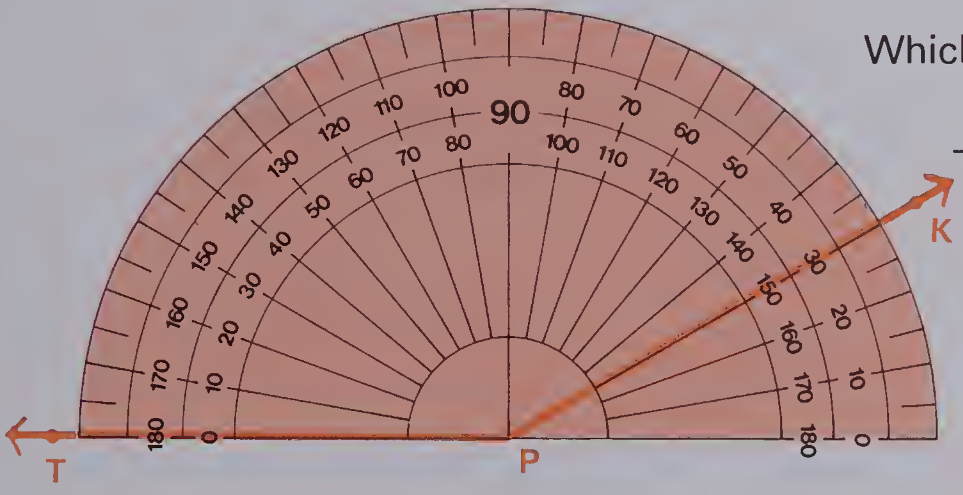
What is the measurement of ∠ KPT?





First decide whether the angle
is greater than or less than 90°.

Place your protractor on the angle.



Which is the correct
measurement
– 150° or 30°?

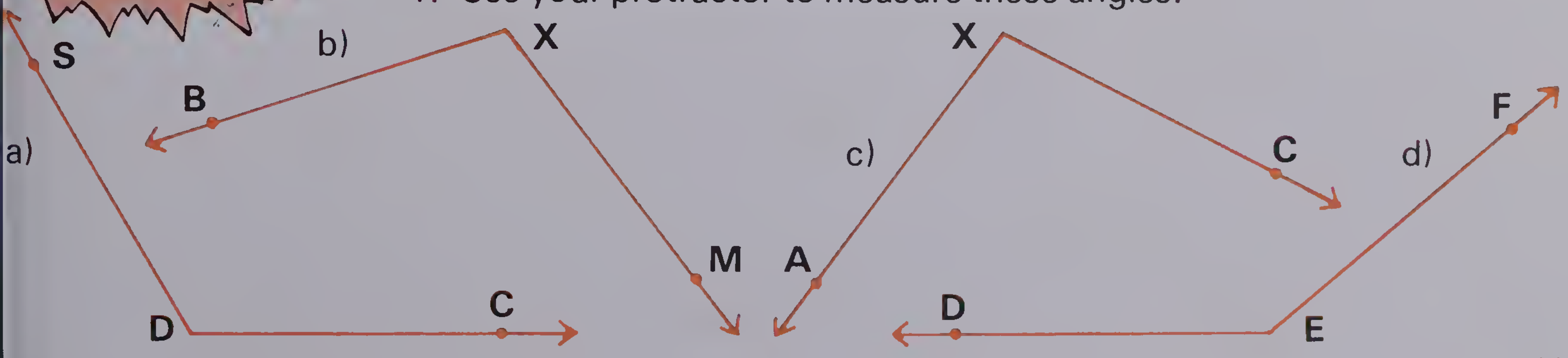
Be sure one arm of the angle is on the base line of the protractor.

Remember where to place the vertex of the angle!

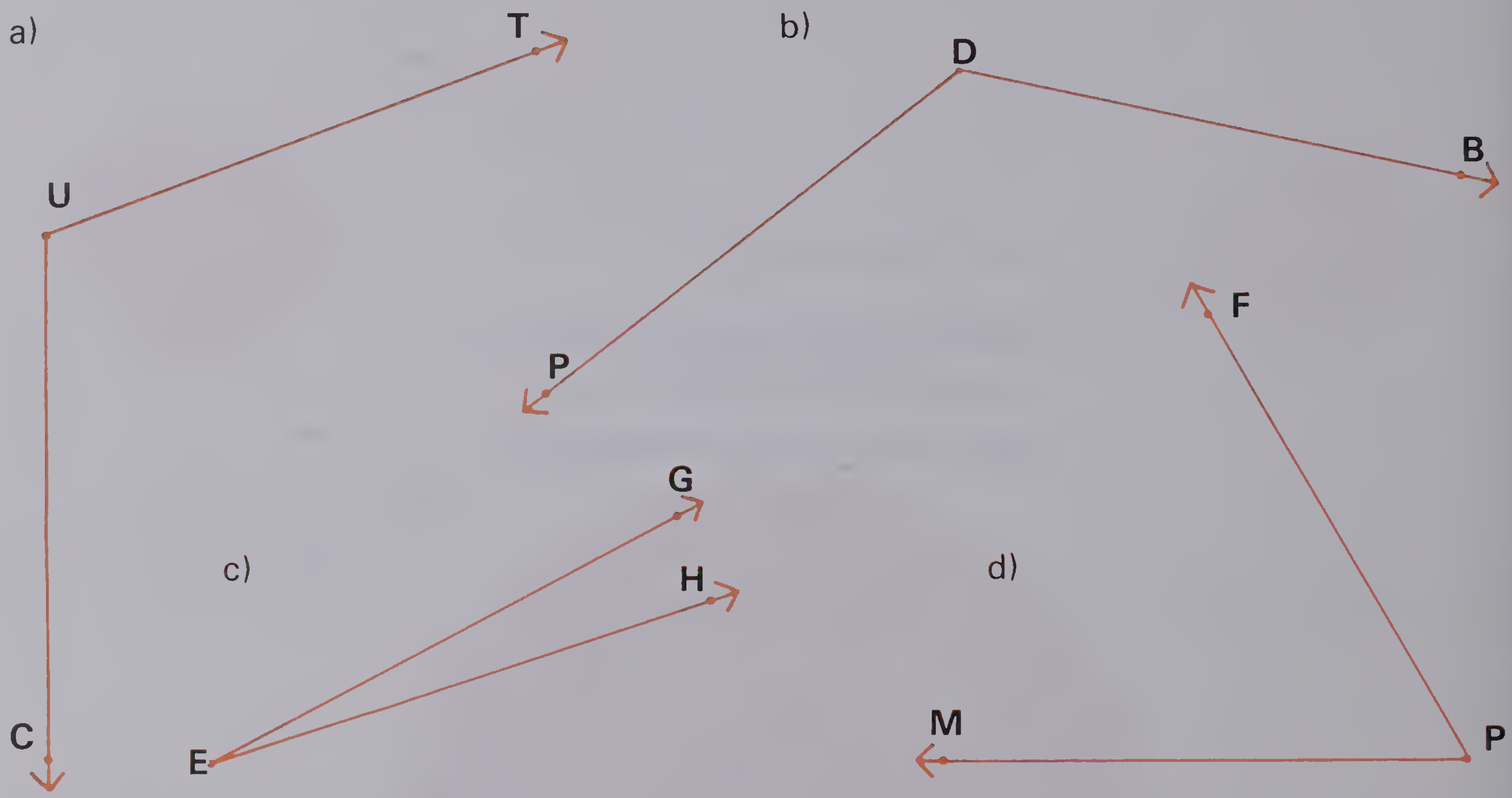
Because the angle is greater than 90°,
we know ∠ KPT = 150°.

IN ACTION

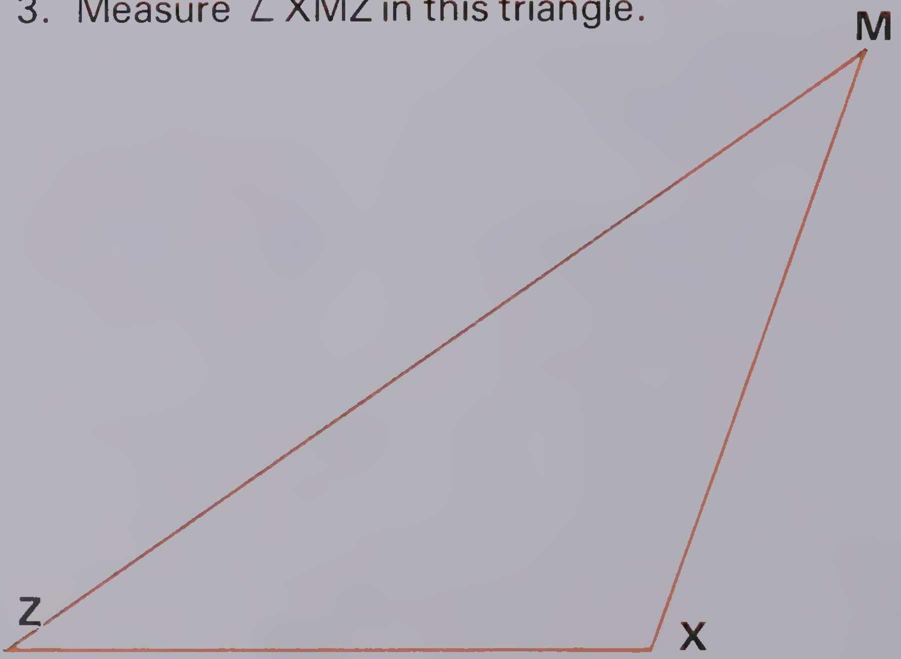
1. Use your protractor to measure these angles.



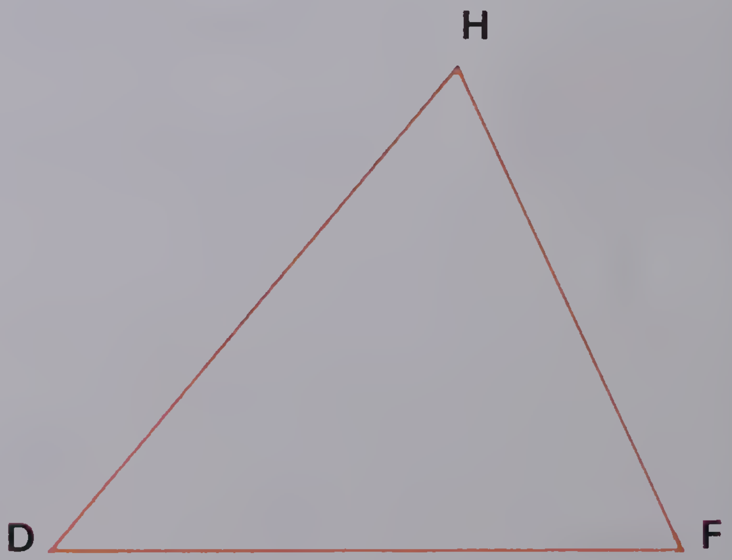
2. Use your protractor to measure these angles.


a)
T
U
C
b)
D
B
P
G
c)
H
E
d)
F
M
P

3. Measure ∠XMZ in this triangle.



4. Measure ∠HDF in this triangle.



6174

The greatest number with these digits is	7641
The least number is	1467
The difference is	6174

Try this using the 4 digits

9384

The greatest number is	9843
The least number is	3489
The difference is	6354

Now make the greatest number and the least number from the digits in the difference.

Greatest Number	6543
Least Number	3456
Difference	3087

Repeat the process.

Greatest Number	8730
Least Number	0378
Difference	8352

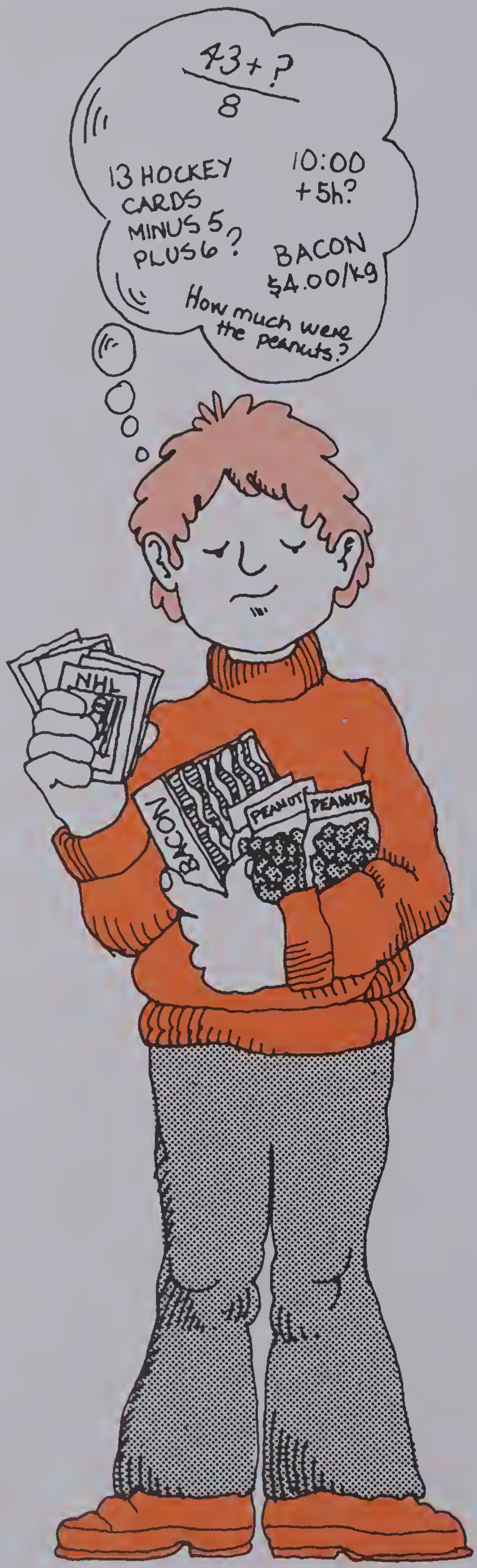
Repeat the process.

Greatest Number	8532
Least Number	2358
Difference	6174

Try this with any other 4-digit number.

Don't stop too soon!

Word Problems

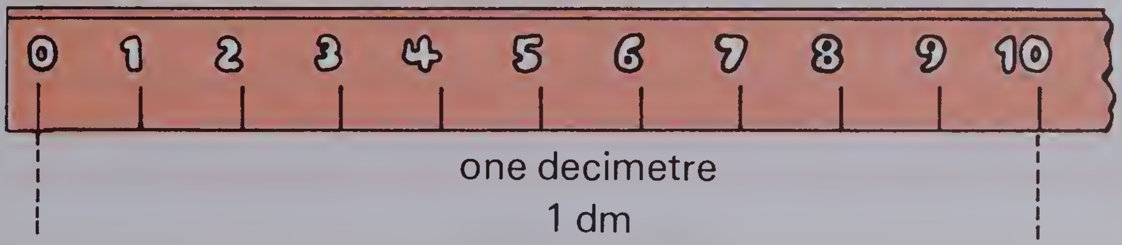

43+? / 8
13 HOCKEY CARDS MINUS 5 PLUS 6 ?
10:00 +5h?
BACON $4.00/kg
How much were the peanuts?
NHL
BACON
PEANUTS
PEANUTS

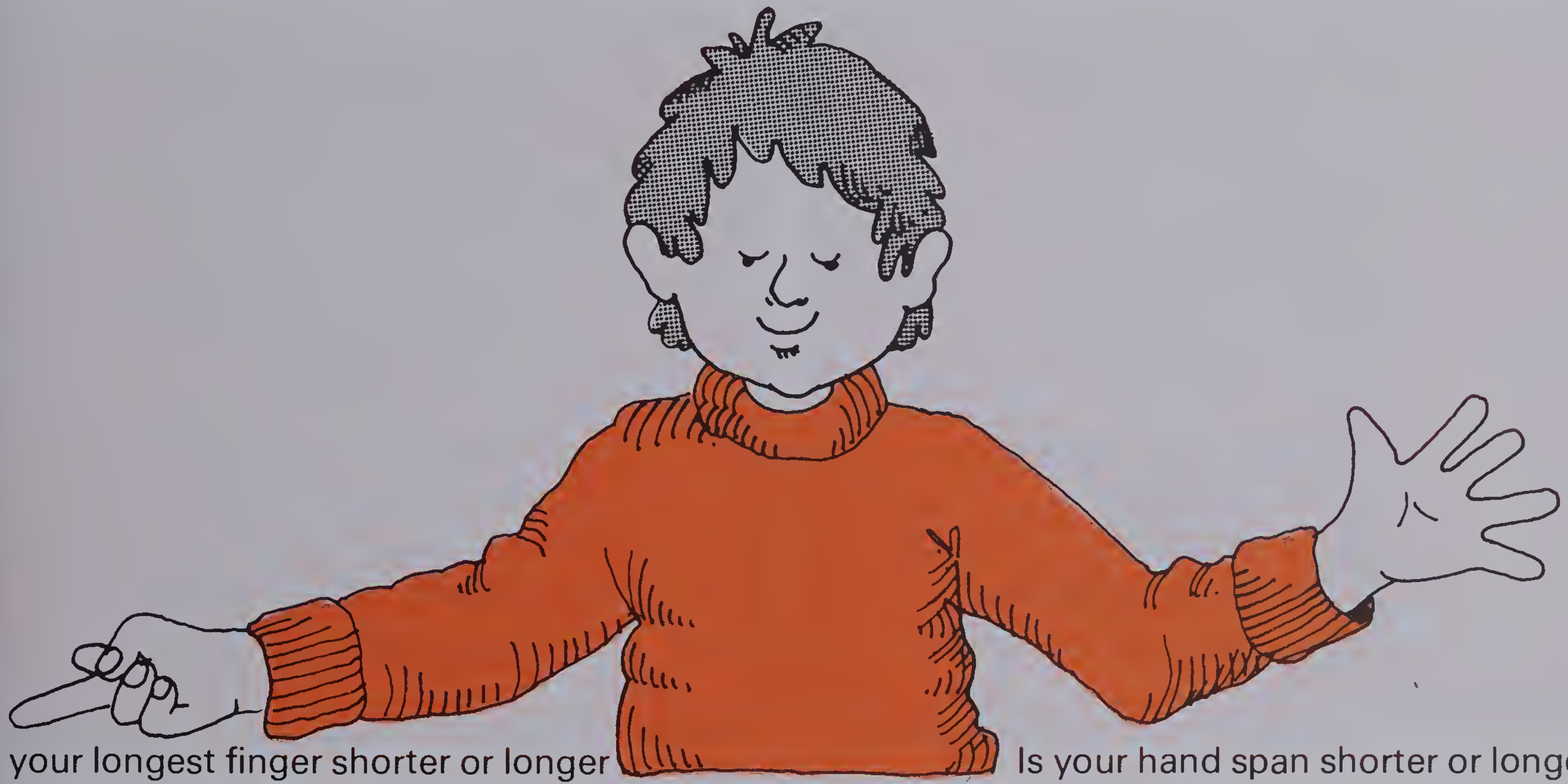
1. What is the smallest number you can add to 43 to make it divisible by 8?
2. What is the smallest number you can add to 67 to make it divisible by 9?
3. Eric had 13 hockey cards. He lost 5 then gained 6. How many does he have now?
4. Angela had 22 marbles. She lost 10 then gained 14. How many does she have now?
5. Jenny left home at 10:00. She returned 5 h later. At what time did she return?
6. Gino left for work at 08:00. He returned 9 h later. At what time did he return?
7. Bacon costs $4.00/kg. What will 1.5 kg cost?
8. Coffee costs $4.80/kg. What will 1.5 kg cost?
9. There are 52 children. 4 children do not wish to play a game. How many teams of 8 can be chosen?
10. 65 students want to play a game. How many teams of 7 can be chosen?
11. How many apples can I buy for 50¢, if they cost 25¢ for 2?
12. How many pomegranates can I buy for $1.50, if they cost 50¢ for 3?
13. Lindsey bought 2 bananas at 15¢ each. She had 20¢ left. How much money did she have at first?
14. Lorne bought 3 packages of peanuts at 20¢ each. He had 12¢ left. How much money did he have at first?

67+? / 9
CAN I BUY 3 APPLES FOR 50¢?
22 marbles lost 10 gained 14 mmm?
2 Bananas at 15¢ + 20¢ = ?
Coffee

EXPLORE

LENGTH/The Decimetre dm


0
1
2
3
4
5
6
7
8
9
10
one decimetre
1 dm

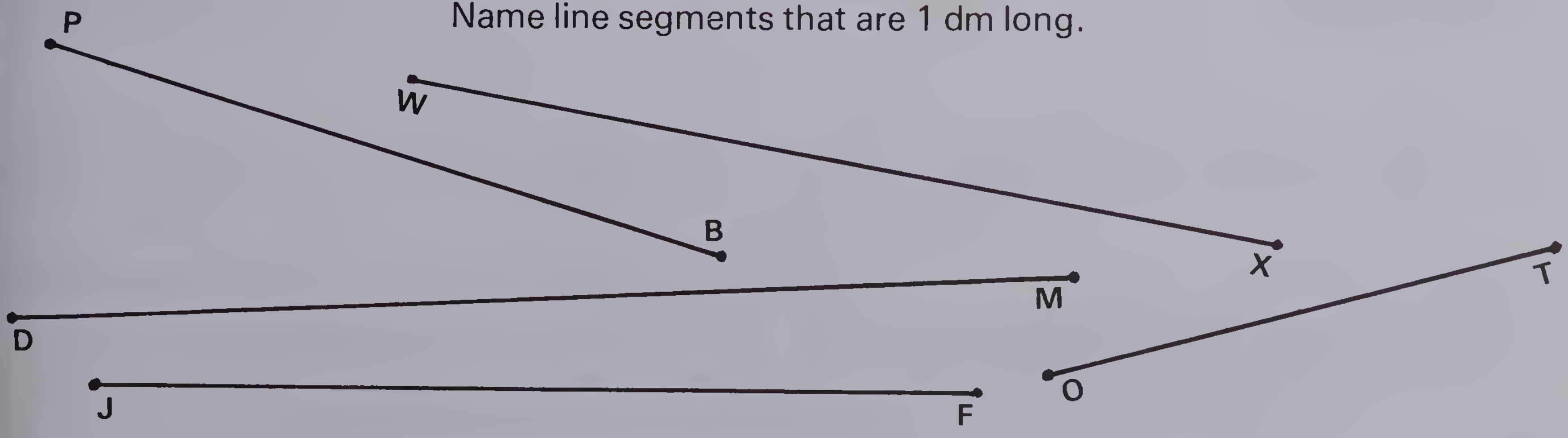


Is your longest finger shorter or longer than a decimetre?

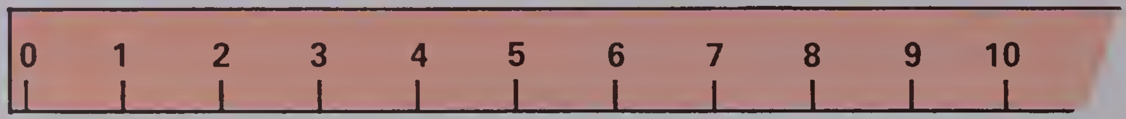
Is your hand span shorter or longer than a decimetre?

Try to get a good concept of 1 dm.

Name line segments that are 1 dm long.


P
W
B
X
T
M
D
O
J
F

Expressing Decimetres in Centimetres
Expressing Centimetres in Decimetres



1 dm = 10 cm

How many centimetres
are there in 3 dm?

Multiplying by 10 is easy.
1 dm = 10 cm
3 dm = (3 × 10) cm
3 dm = 30 cm

How many centimetres
are there in 5.2 dm?
1 dm = 10 cm
5.2 dm = (5.2 × 10) cm
5.2 dm = 52 cm

How many decimetres
are there in 40 cm?

Dividing by 10 is easy.
10 cm = 1 dm
40 cm = (40 ÷ 10) dm
40 cm = 4 dm

How many decimetres
are there in 57 cm?
10 cm = 1 dm
57 cm = (57 ÷ 10) dm
57 cm = 5.7 dm

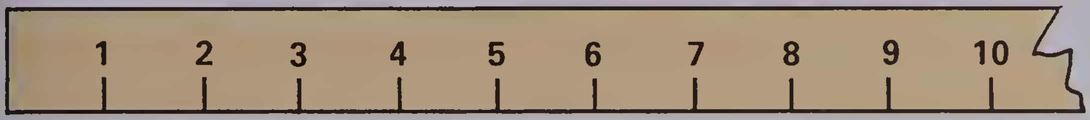
IN ACTION

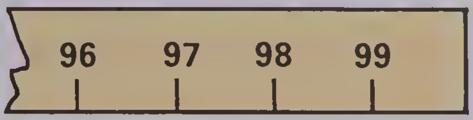
1. Complete.
   a) 7 dm = ? cm b) 2 cm = ? dm c) 2 dm = ? cm d) 34 cm = ? dm
   e) 15 cm = ? dm f) 163 cm = ? dm g) 25 dm = ? cm h) 238 cm = ? dm

2. Look at your ruler.
   What is its length in centimetres?
   What is its length in decimetres?

3. Estimate the length of one section of the blackboard
   a) in centimetres b) in decimetres.
   Measure the length in centimetres.
   Express the length in decimetres.

Expressing Decimetres in Metres
Expressing Metres in Decimetres





10 dm = 1 m

How many decimetres
are there in 3 m?

Multiplying by 10 is easy.
1 m = 10 dm
3 m = (3 × 10) dm
3 m = 30 dm

How many decimetres
are there in 3.5 m?
1 m = 10 dm
3.5 m = (3.5 × 10) dm
3.5 m = 35 dm

How many metres
are there in 40 dm?

Dividing by 10 is easy.
10 dm = 1 m
40 dm = (40 ÷ 10) m
40 dm = 4 m

How many metres
are there in 53 dm?
10 dm = 1 m
53 dm = (53 ÷ 10) m
53 dm = 5.3 m

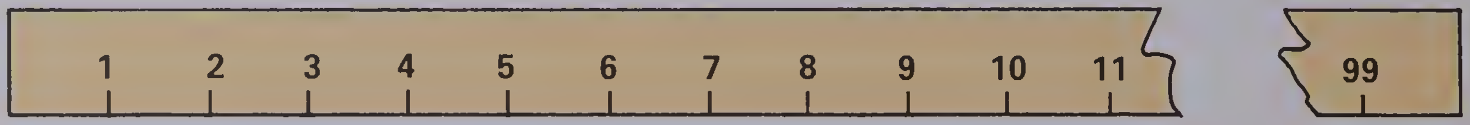
IN ACTION

1. Complete.
   a) 11 dm = ? m　b) 2 dm = ? m　c) 0.5 m = ? dm　d) 18 dm = ? m
   e) 14 m = ? dm　f) 30 dm = ? m　g) 0.9 m = ? dm　h) 24 dm = ? m

2. Measure the length of your arm to the nearest decimetre.
   Express this length in metres.

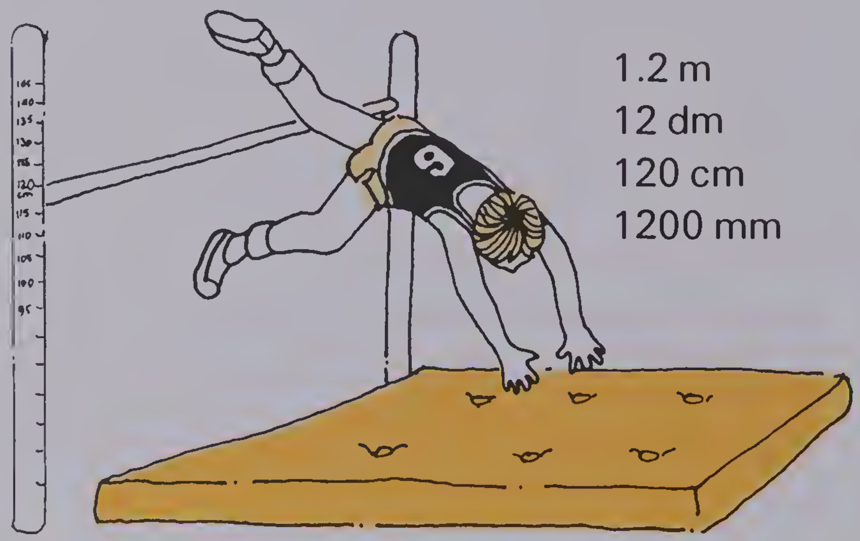
3. Estimate the height of your classroom in metres.
   Measure the height in metres.
   Express the height in decimetres.

Relating Millimetres, Centimetres, Decimetres, and Metres



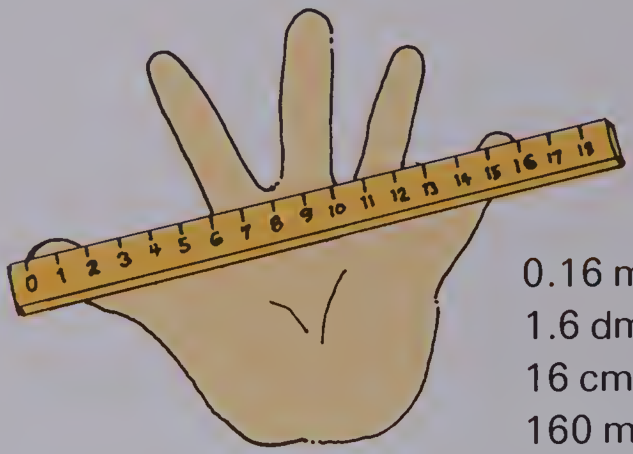
1 m
10 dm
100 cm
1000 mm

How high did he jump?



1.2 m
12 dm
120 cm
1200 mm

How long is your hand span?



0.16 m
1.6 dm
16 cm
160 mm

IN ACTION

1. Complete.

a) 2.5 m	25 dm	? cm	? mm
b) ? m	? dm	? cm	40 mm
c) ? m	? dm	65 cm	? mm
d) ? m	11 dm	? cm	? mm

2. Measure your hand span to the nearest centimetre.

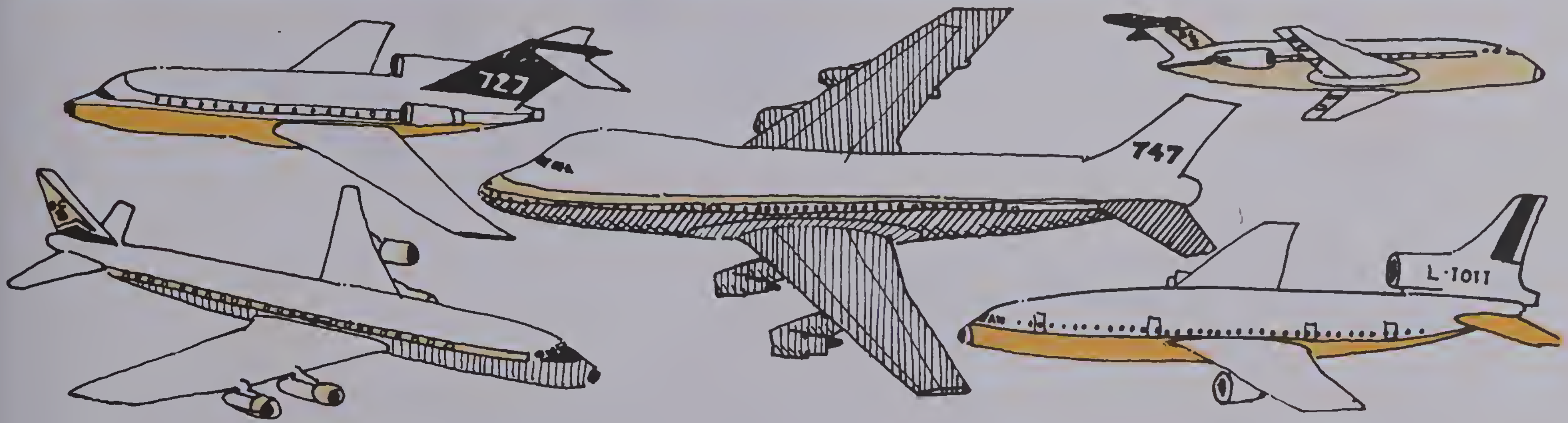
   Express its length in millimetres, in decimetres, and in metres.

3. Measure, in centimetres, the distance between the fingertips of your outstretched arms.

   Express this measurement in millimetres, in decimetres, and in metres.

Word Problems

Type of airplane	L-1011	B-747	DC8	DC9	B-727
Number of passengers	257	365	198	95	144
Range	5900 km	8000 km	8000 km	2500 km	4160 km
Cruising speed	920 km/h	920 km/h	880 km/h	850 km/h	896 km/h
Length	54 m	70 m	57 m	36 m	48 m
Wingspan	47 m	59 m	45 m	28 m	32 m
Height	16 m	19 m	12 m	8 m	10 m



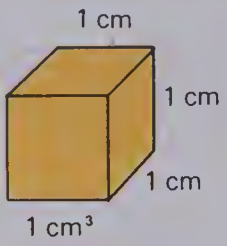
1. What is the distance in a) metres and b) kilometres when all 5 airplanes are placed wingtip to wingtip?
2. The wingspan of the L–1011 is approximately how many times greater than its height?
3. Is the relationship between wingspan and height of the L–1011 true for the other 4 airplanes?
4. Approximately how many times longer than the DC9 is the B–747?
5. How many times more passengers than the DC9 can the B–747 carry?
6. If the airplanes were lined up nose-to-tail, what would be their combined length?
7. The CN Tower in Toronto is 553 m tall. What is the difference between the height of the CN Tower and the combined length of the airplanes?
8. What is the least number of airplanes that can be used to transport 1850 passengers?
9. What is the least number of airplanes that can be used to transport 1500 passengers when all 5 types of airplanes are used?
10. What is the least number of airplanes that can be used to transport 2600 passengers from Chicago to New York City, a distance of 1149 km?
11. Estimate the flying time for an L–1011 travelling 2516 km from Moscow to London.
12. Estimate the flying time for a DC8 travelling 7080 km from Nairobi to Montreal.

EXPLORE

VOLUME

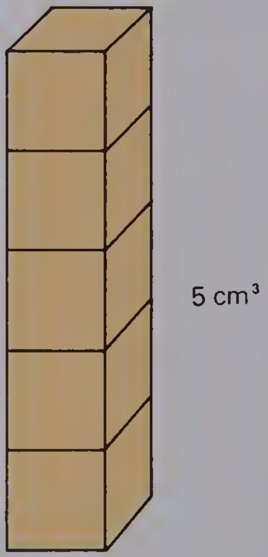
The amount of space an object occupies is called its **volume.**

PARTY COOKIES
PARTY COOKIES


1 cm
1 cm
1 cm
1 cm³

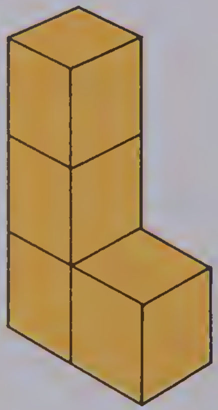
This is 1 unit of volume.
It is 1 cm long, 1 cm wide, and 1 cm high.
It is called 1 cm^3 (one cubic centimetre).

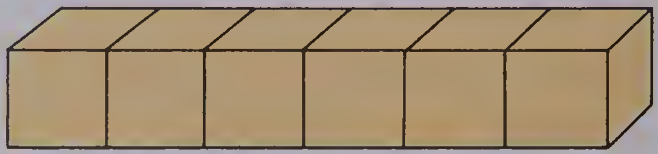
Here is a structure made with five 1 cm cubes.
Its volume is 5 cm^3.

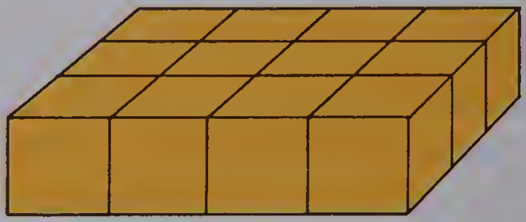


How many different structures can you make using five 1 cm cubes? Use cubes to help you decide. What is the volume of each structure?

These structures are made with 1 cm cubes.
What is the volume of each one?



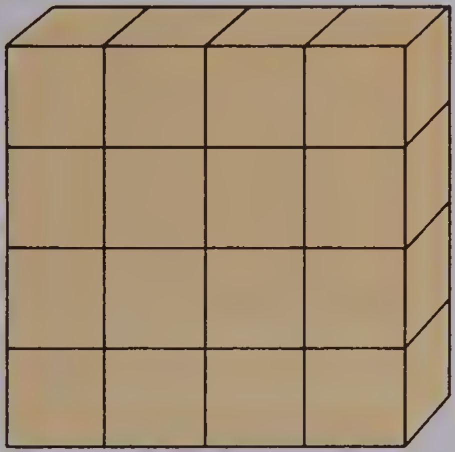




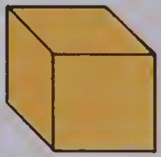
IN ACTION

1. What is the volume of each structure?
Each cube is 1 cm^3.

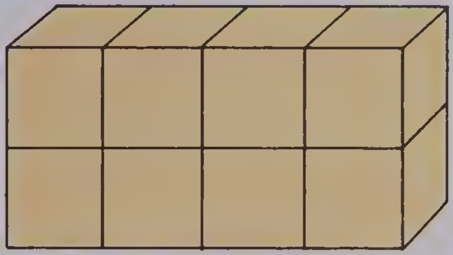
a)



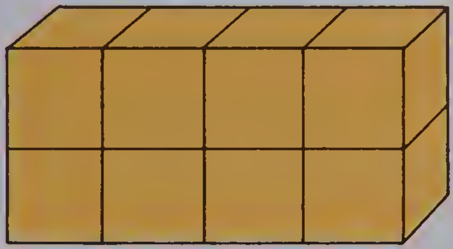
b)



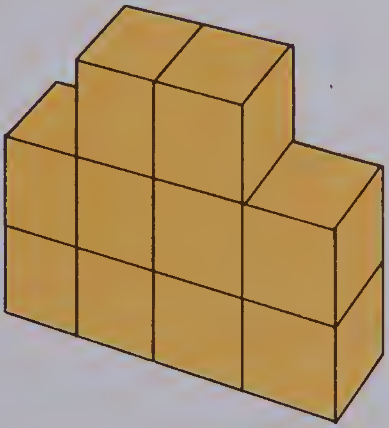
c)



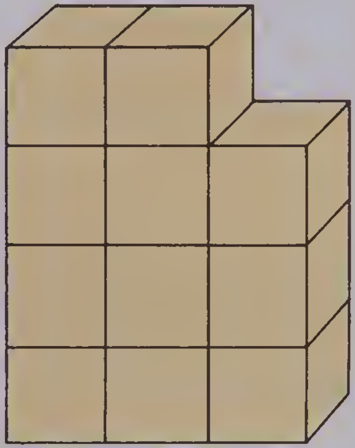
d)



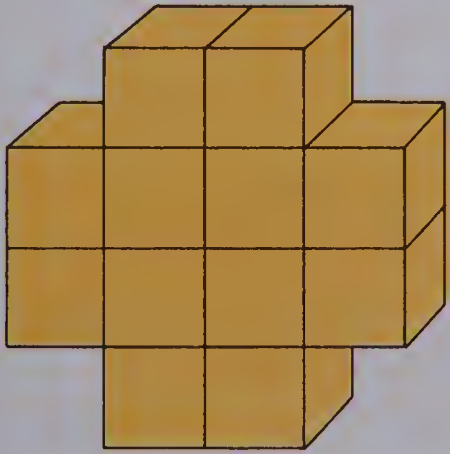
e)



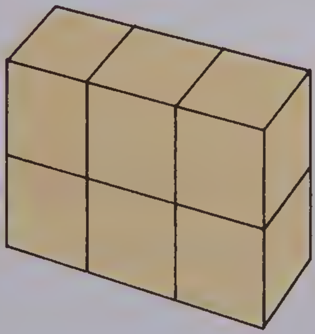
f)



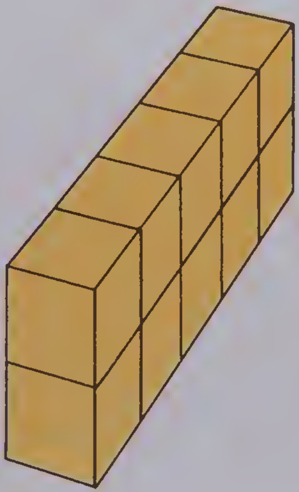
g)



h)

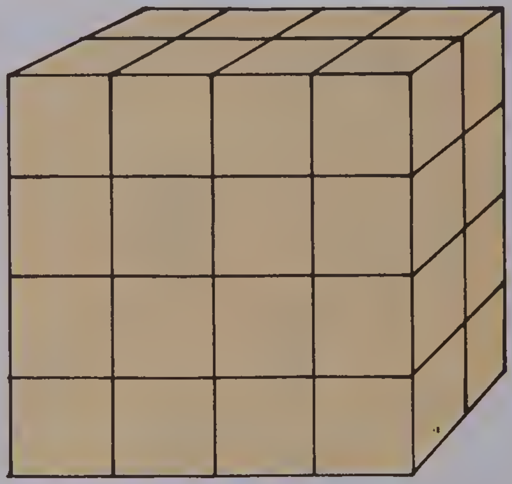


i)



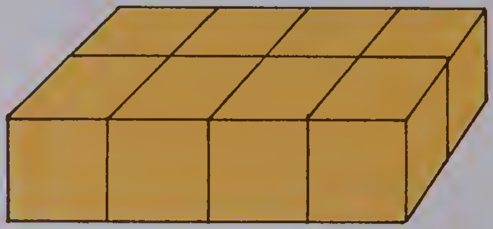
Layers

Now think about structures with more than 1 layer, but with the same number of cubes in each layer.



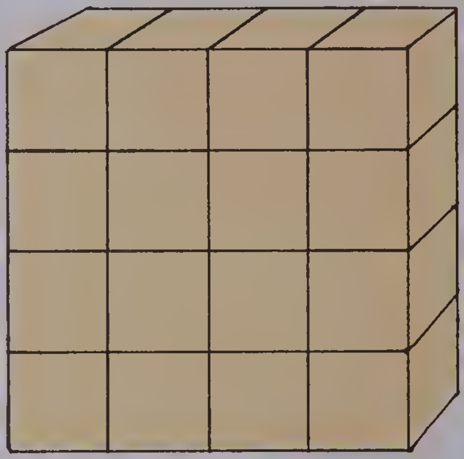
If you look at the top of the structure, there are 8 cubes in 1 layer.
There are 4 layers, each with 8 cubes.

The volume of the whole structure is 32 cm³.

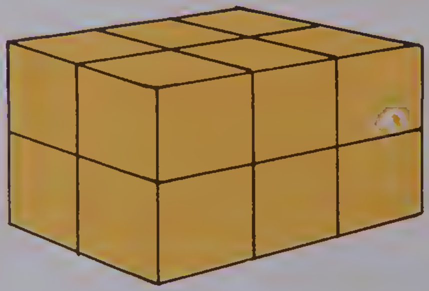


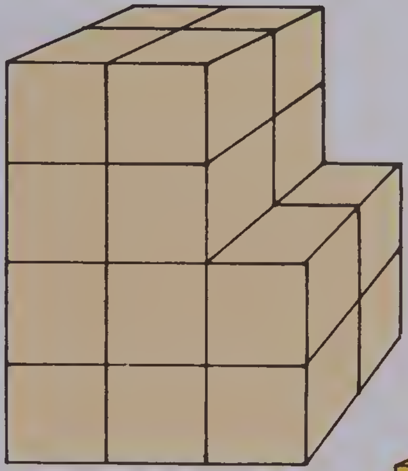
If you look at the side of the structure, there are 16 cubes in 1 layer.
There are 2 layers, each with 16 cubes.

The volume is 32 cm³.

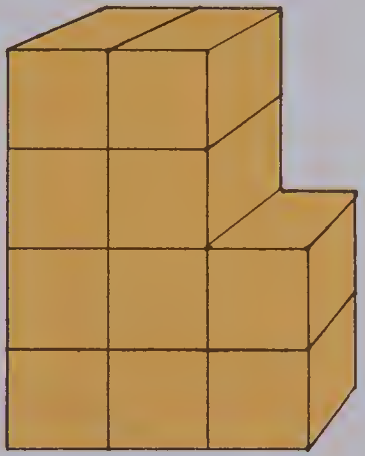


Look at this structure!
If you say there are 6 cubes in a layer, how many layers are there?
If you say there are 4 cubes in a layer, how many layers are there?

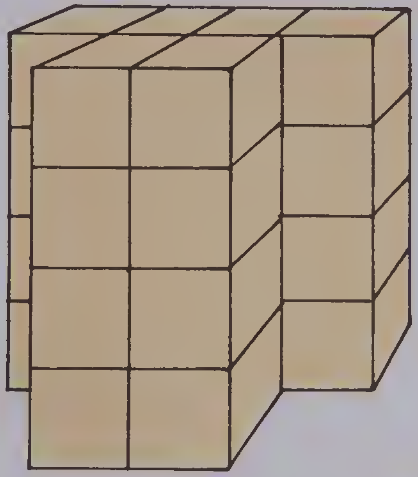




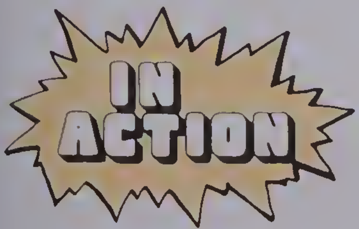
Look at this structure.
If you look at it from the top,
each layer doesn't have
the same number of cubes.



Look at it from the side.
There are 10 cubes in the first layer.
How many cubes are in the second layer?
What is the volume of the structure?

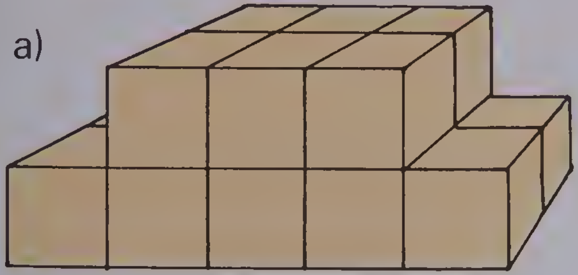


How would you look at this structure
so that each layer would have
the same number of cubes?
How many cubes are there in 1 layer?
How many layers are there?
What is the volume of the structure?



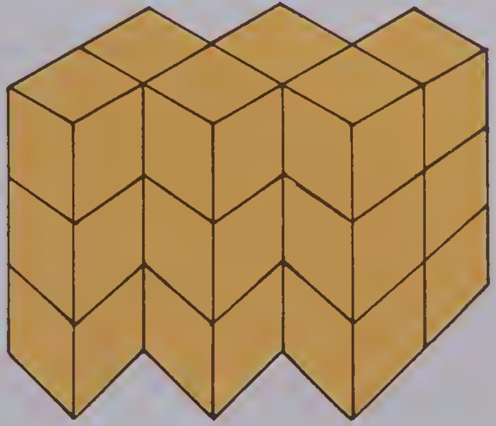
1. Find the volume of each structure.
   Each cube is 1 cm³.

a)



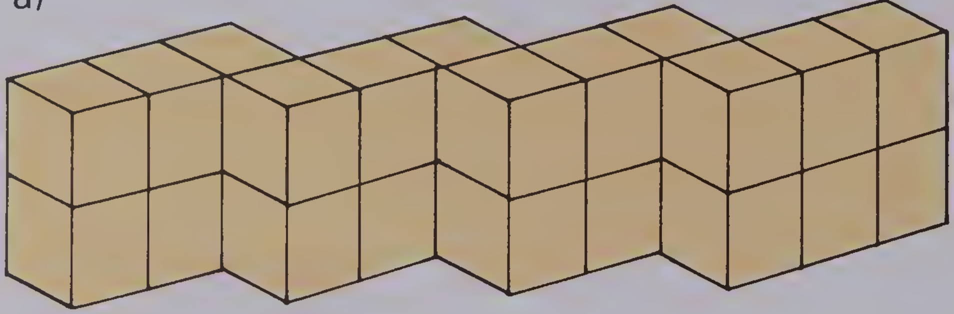
What is the volume
of 1 layer?
How many layers are there?
What is the volume
of the whole structure?

b)

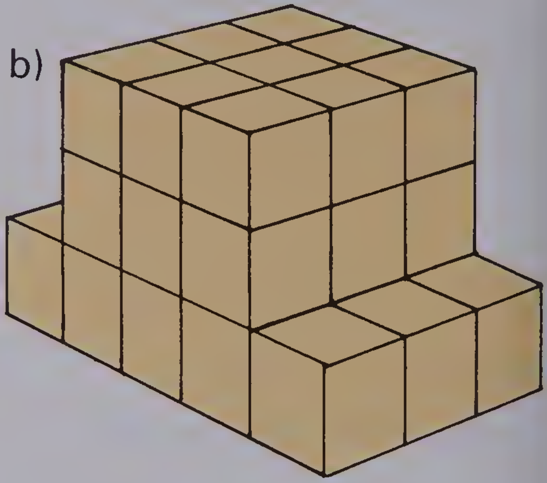


2. Find the volume of each structure.
Each cube is 1 cm³.

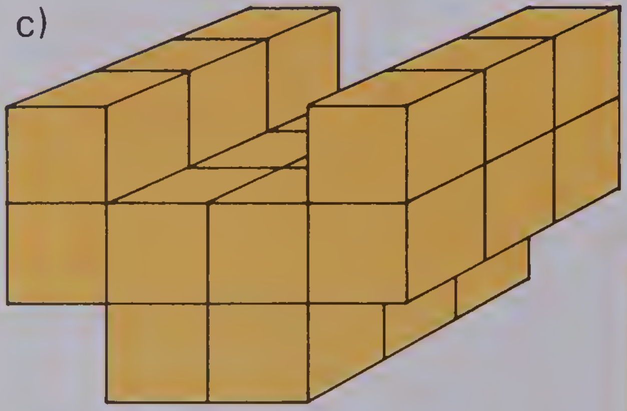
a)



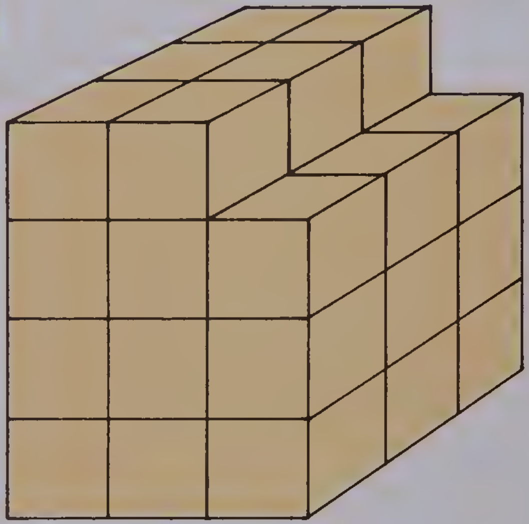
b)



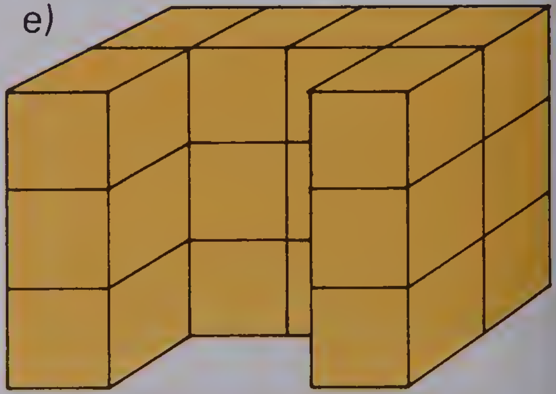
c)



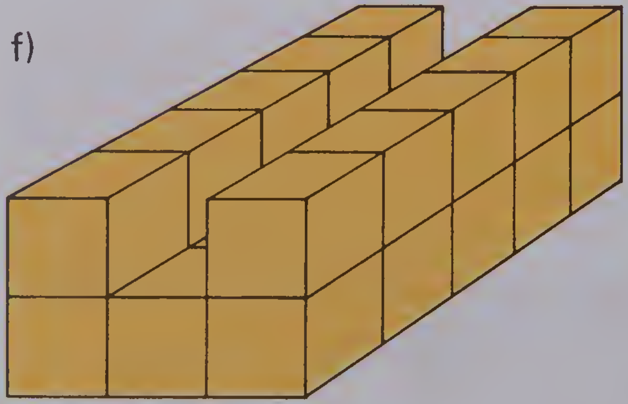
d)



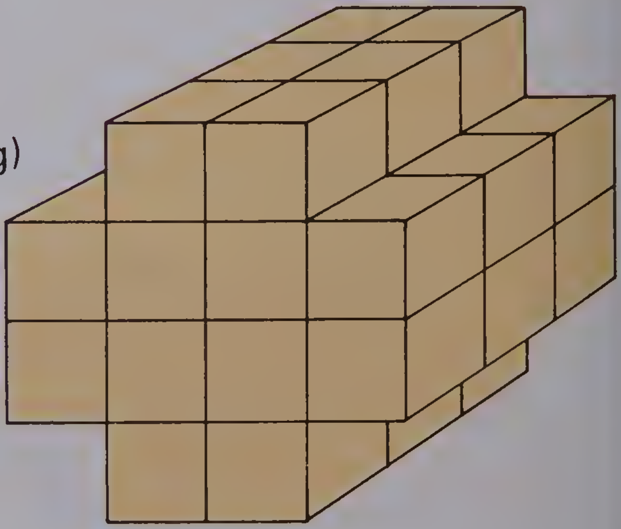
e)



f)

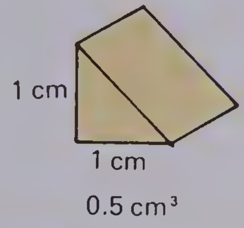


g)

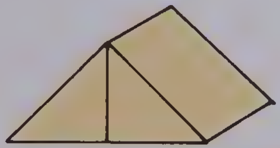


Half-Cubes

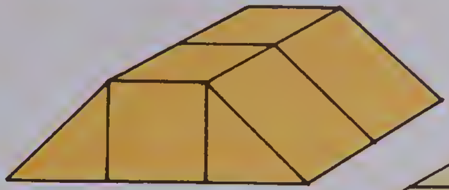
This part cube has a volume of 0.5 cm³.



What is the volume of this structure?



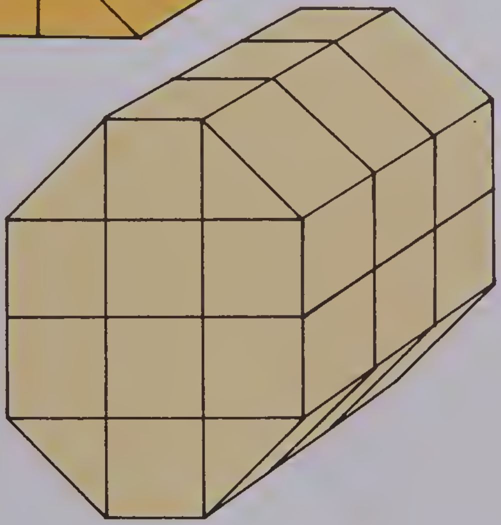
What is the volume of this structure?



Now look at this structure.
What is the volume of 1 layer?

How many layers are there?

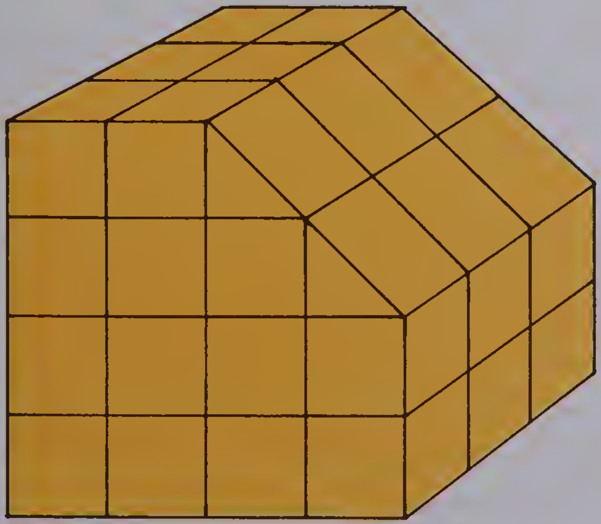
What is the volume of the whole structure?



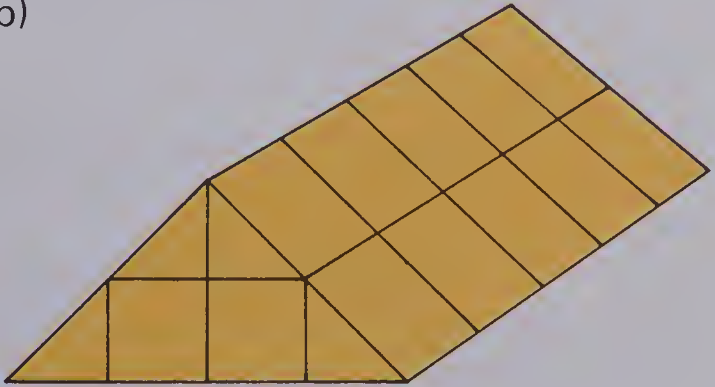
IN ACTION

1. What is the volume of each of the structures?
Each whole cube is 1 cm³.

a)

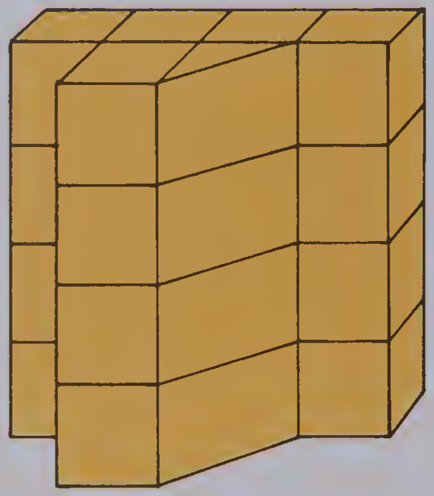


b)

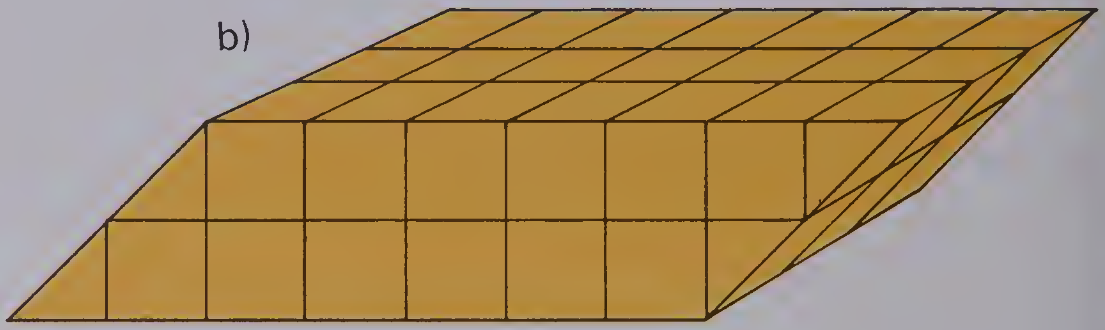


2. Find the volume of each structure.
Each whole cube is 1 cm³.

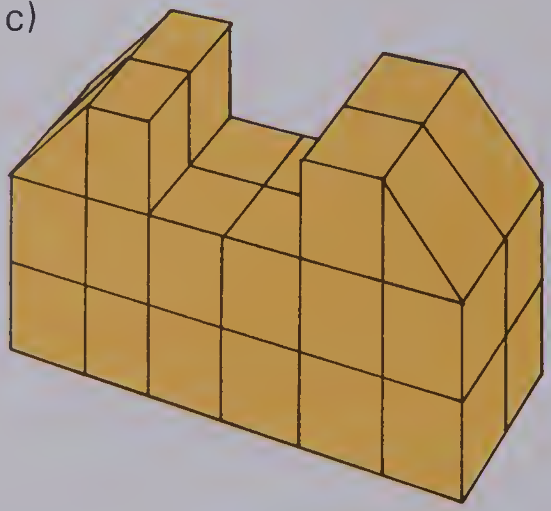
a)



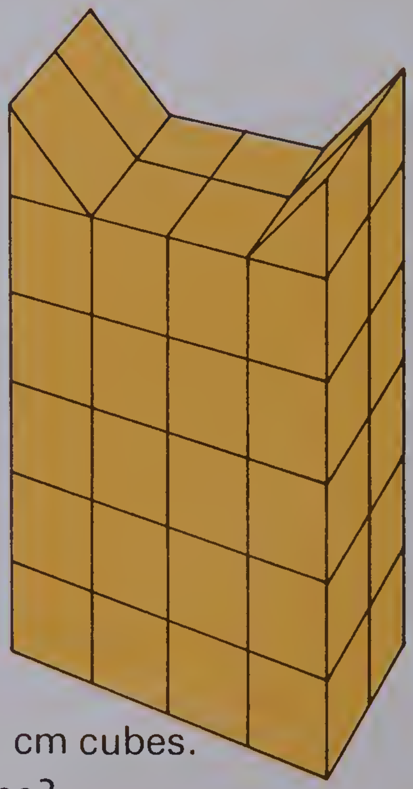
b)



c)

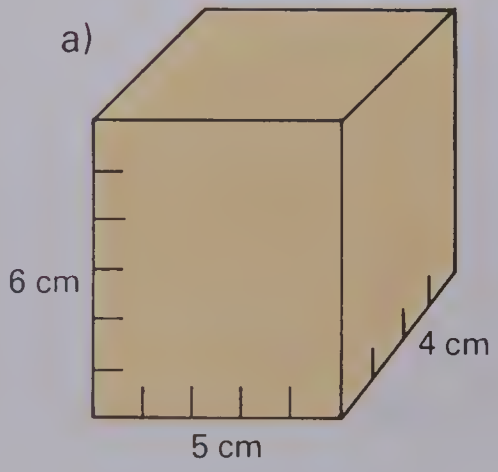


d)

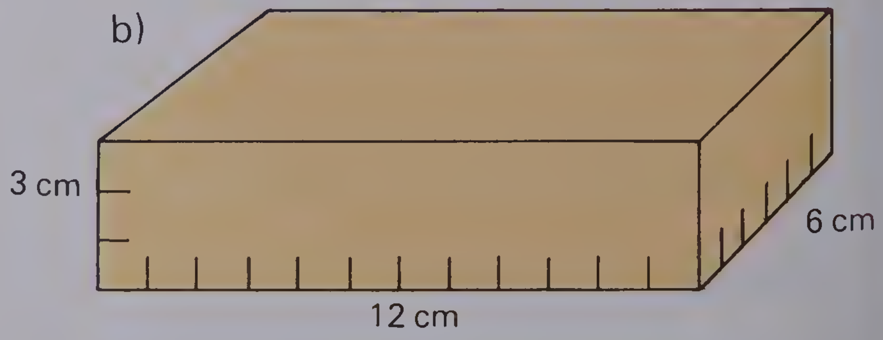


3. Each of these structures is made from 1 cm cubes.
What is the volume of each one?

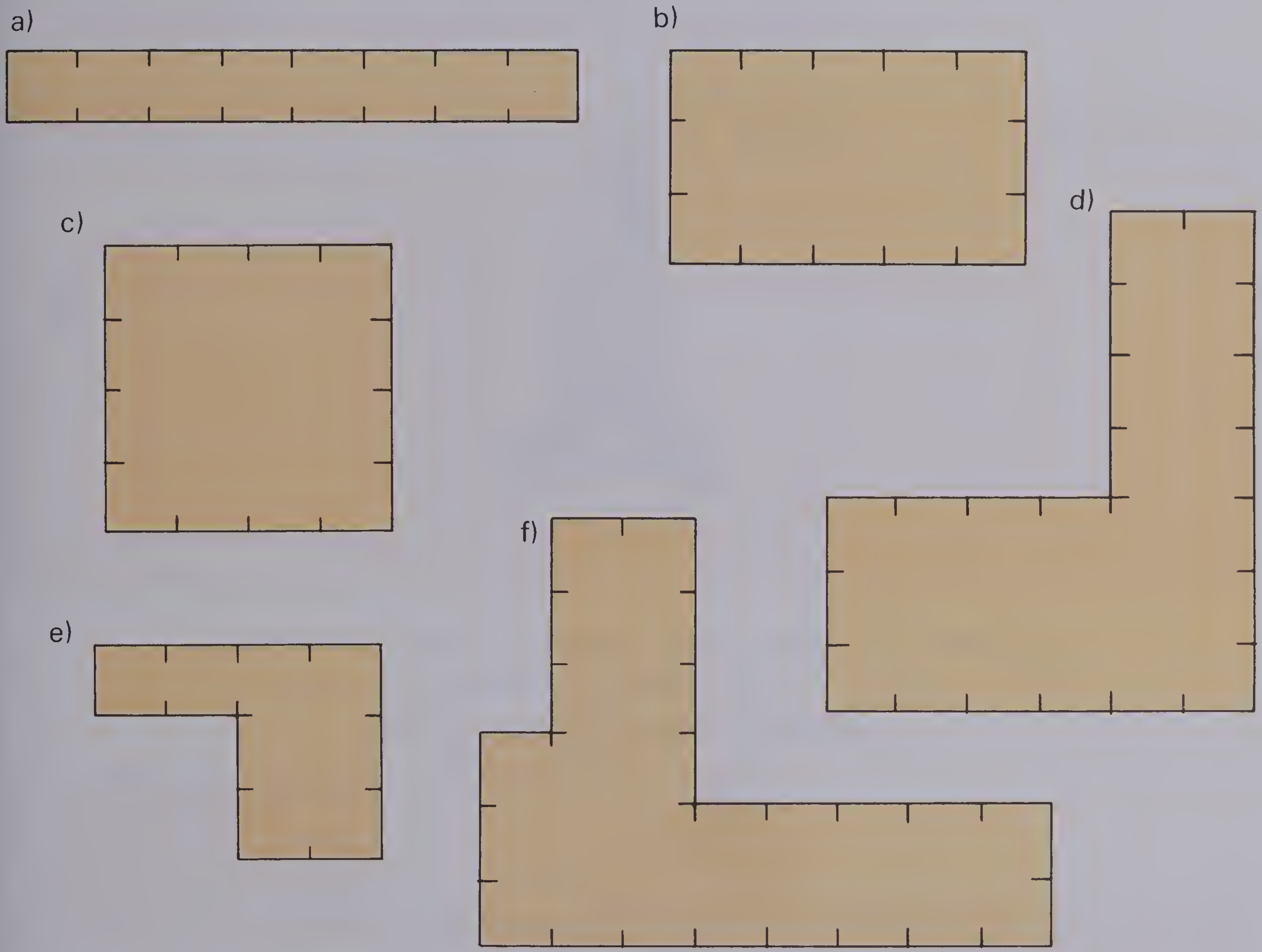
a)



b)


3 cm
6 cm
12 cm

✓4. Find the perimeter, in centimetres, of each shape.

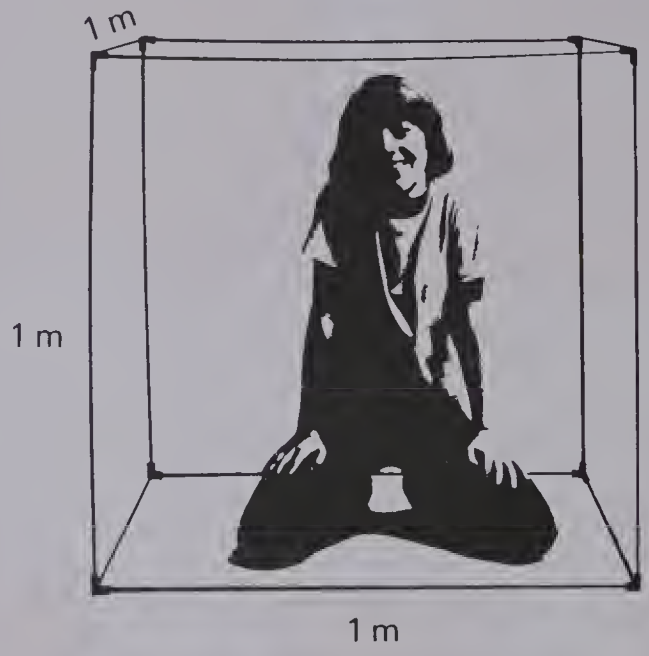


✓5. Find the area of each shape in square centimetres.

✓6. Suppose you built a structure 3 layers high on each shape in Question 4. What would be the volume of each structure in cubic centimetres?

The Cubic Metre m³

A unit of volume which is 1 m long, 1 m wide, and 1 m high is called 1 m³ (one cubic metre).



Your classroom might be about 10 m long, 8 m wide, and 3 m high. The volume would be 240 m³.

How do you use the numbers 10, 8, and 3 to obtain the number 240?

Think of a volume of 24 m³. The dimensions could be:

Length	Width	Height
4 m	3 m	2 m
6 m	2 m	2 m
8 m	3 m	1 m
12 m	2 m	1 m
24 m	1 m	1 m

Can you find any other sets of dimensions?

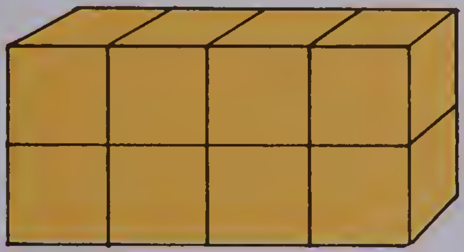
IN ACTION

1. For each volume, give possible dimensions.

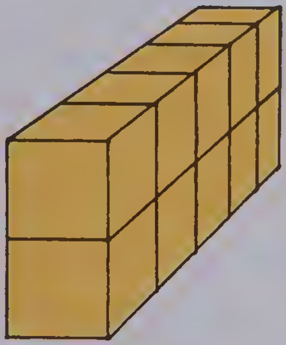
Volume	Length (m)	Width (m)	Height (m)
6 m^3			
20 m^3			
30 m^3			
45 m^3			

2. If each cube represents 1 m^3, what is the volume of each structure?

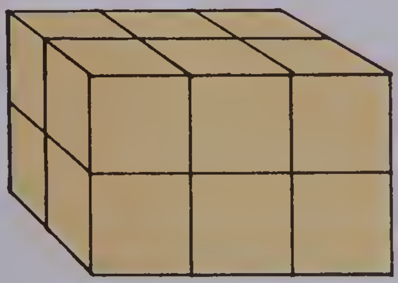
a)



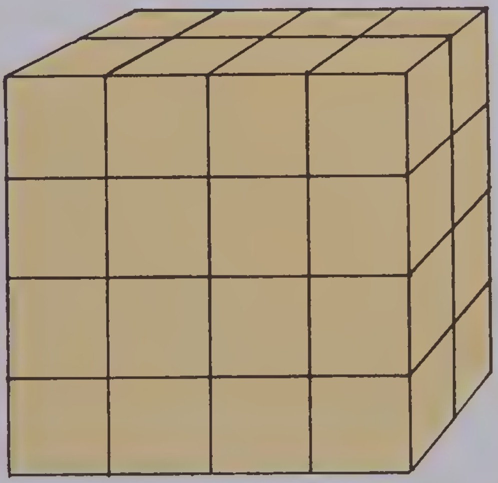
b)



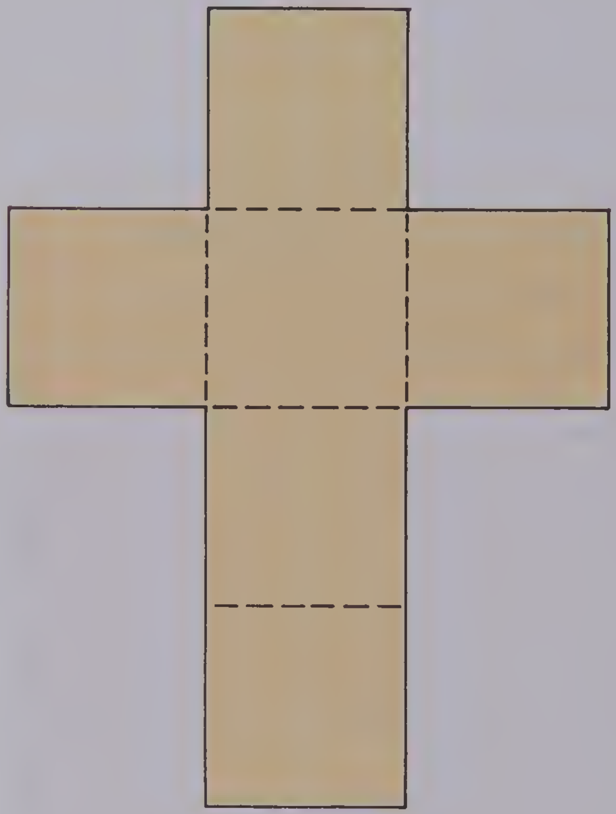
c)



d)



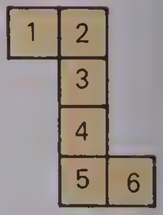
Patterns for a Cube



This is 1 pattern we can fold to make a cube. Use this pattern to make your own 2 cm by 2 cm by 2 cm cube. Cut the pattern from heavy paper and tape the sides together.

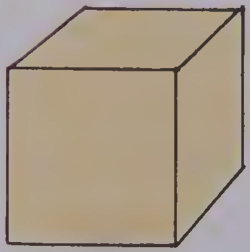
There are many more patterns that will make this cube. Try this one.

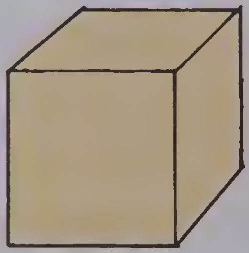
1. Place your cube on paper and trace its perimeter.
2. Roll the cube once to the right and trace the perimeter.
3. Roll the cube down once. Trace.
4. Roll down. Trace.
5. Roll down. Trace.
6. Roll once to the right. Trace.

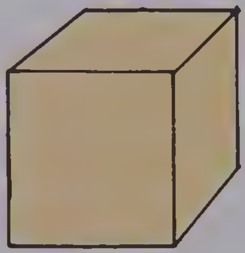


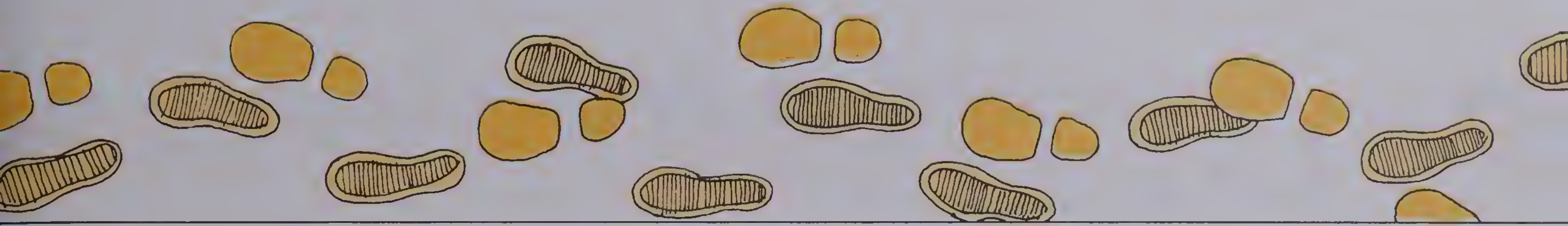
Look at the pattern above. Count the number of outside edges.
Count the number of outside edges
for the pattern that you just made.
What did you find?

Find as many different ways as you can
to make different patterns for a cube.
Cut out each pattern and check to see if you are correct.



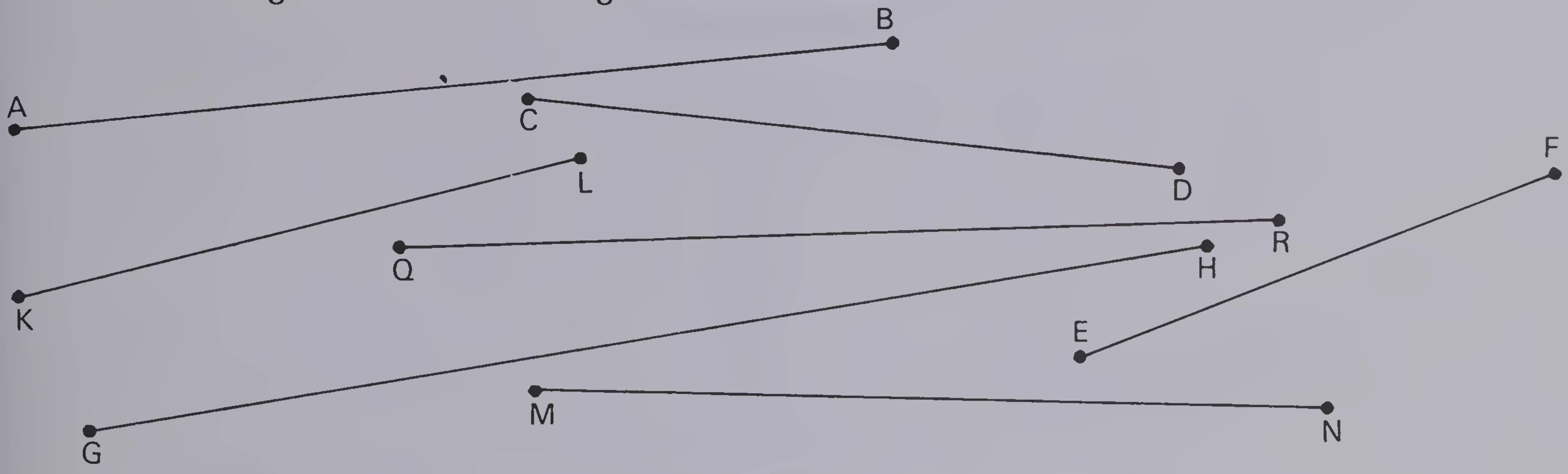






Retrace Your Steps

1. Which line segments are 1 dm long?

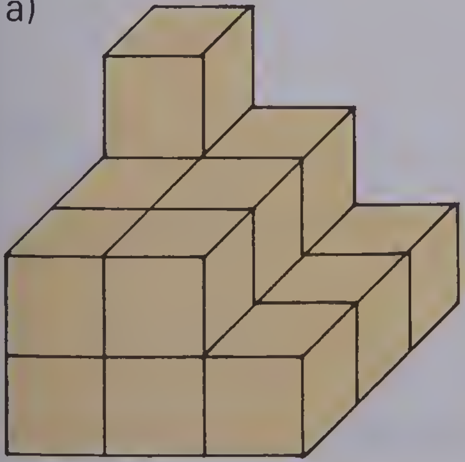


2. Tell 3 ways you can measure approximately 1 dm using parts of your body.

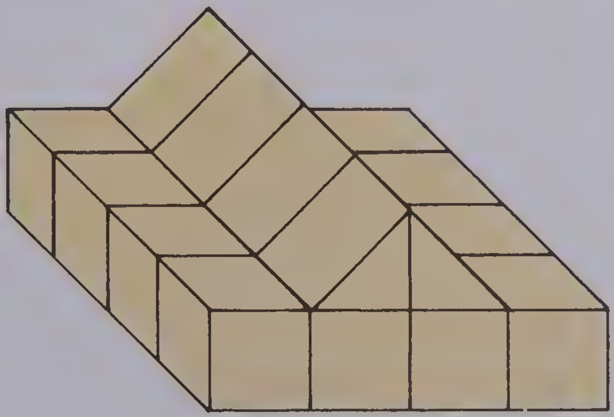
3. a) Measure the width of your *mathways 5* text in centimetres. Express the measurement in decimetres.
   b) Measure your hand span in decimetres. Express the measurement in centimetres.
   c) Measure the length of your desk in decimetres. Express the measurement in metres.
   d) Measure your foot in millimetres. Express the measurement in centimetres and in decimetres.

4. Find the volume of these structures. Each cube is 1 cm^3.

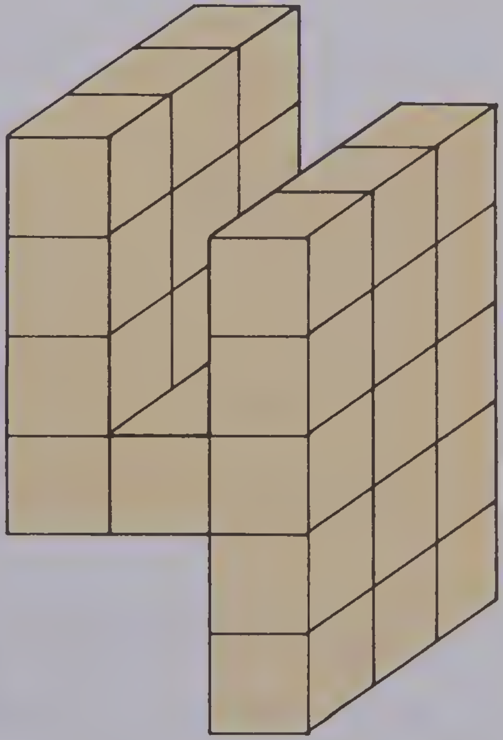
a)



b)



c)



MULTIPLICATION/Multiplying by a 2-Digit Factor

Multiply 39 by 24.
Here is one way.

$$\begin{array}{rcr} 39 & = & 30 + 9 \\ \underline{24} & \underline{=} & \underline{20 + 4} \\ \multicolumn{3}{r}{600 + 180 + 120 + 36} \\ & = & 936 \end{array}$$

$$\begin{array}{r} 4 \times 9 = 36 \\ 4 \times 30 = 120 \\ 20 \times 9 = 180 \\ 20 \times 30 = \underline{600} \\ \text{Add} \quad 936 \end{array}$$

You can record the products in a column.

$$\begin{array}{rl} 39 & \\ \underline{24} & \\ 36 & 4 \times 9 \\ 120 & 4 \times 30 \\ 180 & 20 \times 9 \\ \underline{600} & 20 \times 30 \\ 936 & \end{array}$$

Or you can use a short cut.

$$\begin{array}{r} 39 \\ \underline{24} \\ 156 \\ \underline{78} \\ 936 \end{array}$$

Think	Record
36	6
12, 15	15
next row 18	8 one place left
6, 7	7

IN ACTION

1. Multiply. Use the expanded form of each factor.
   a) 27 × 18 b) 46 × 25 c) 59 × 34 d) 68 × 46 e) 49 × 82

2. Multiply. Record the products in a column.
   a) 32 × 19 b) 41 × 28 c) 58 × 46 d) 87 × 54 e) 73 × 62

3. Multiply. Use the short cut.
   a) 18 × 19 b) 27 × 16 c) 35 × 28 d) 47 × 63 e) 29 × 59
   f) 47 × 24 g) 59 × 36 h) 68 × 43 i) 94 × 78 j) 98 × 77

Multiplying by a 2-Digit Factor/Decimals

Multiply 39 by 2.4.

39 is about 40
2.4 is about 2
39 × 2.4 is about 40 × 2 or 80

$$\begin{array}{r} 39 \\ \underline{2.4} \\ 156 \\ \underline{78} \\ 93.6 \end{array}$$

Think	Record
36	6
12, 15	15
next row	
18	8 one place left
6, 7	7

Place the decimal point as shown.

Note: There is 1 digit after the decimal point in the factor 2.4.
There is 1 digit after the decimal point in the product 93.6.

IN ACTION

1. Complete to estimate the product.
   a) 48 × 3.9 is about 50 × 4 or ?
   b) 109 × 5.1 is about ? × ? or ?
   c) 96 × 6.2 is about ? × ? or ?
   d) 121 × 8.9 is about ? × ? or ?
   e) 63 × 7.4 is about ? × ? or ?
   f) 108 × 4.7 is about ? × ? or ?

2. Estimate, then find the product.
   a) 28 × 3.2
   b) 19 × 1.8
   c) 31 × 2.3
   d) 49 × 6.1
   e) 51 × 7.2
   f) 63 × 4.1
   g) 75 × 8.9
   h) 83 × 5.8
   i) 89 × 7.9
   j) 91 × 3.9

3. What is the mass of a sack of 15 large grapefruit, if the mass of each is 1.2 kg?

4. The distance around the park is 1.4 km.
   25 children jogged around the park.
   What is the total distance the children jogged?

Multiplying by a 2-Digit Factor/Decimals

Multiply 5.7 by 29.

5.7 is about 6
29 is about 30
5.7 × 29 is about 6 × 30 or 180

```
   5.7
    29
 -----
   513
  114
 -----
 165.3
```

Think	Record
63	3
45, 51	51
14	4, one place left
10, 11	11

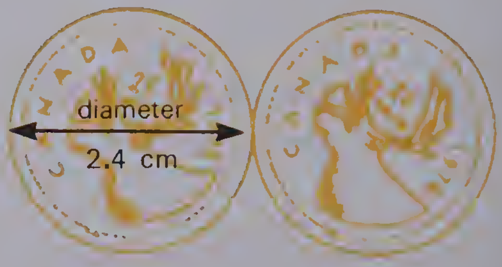
Place the decimal point as shown.

Note: There is 1 digit after the decimal point in the factor 5.7.
There is 1 digit after the decimal point in the product 165.3.

IN ACTION

1. Estimate, then find the product.
   a) 6.3 × 18
   b) 7.8 × 19
   c) 8.4 × 23
   d) 9.1 × 16
   e) 5.8 × 35
   f) 3.7 × 42
   g) 2.9 × 56
   h) 7.4 × 63
   i) 8.7 × 78
   j) 9.9 × 86

2. What is the length of 35 coins? The diameter of each is 2.4 cm.



3. If the thickness of a fifty-cent piece is 1.8 mm, find the height of 75 fifty-cent pieces.

Multiplication with Decimals

Multiply 385 by 6.8.

385 is about 380
6.8 is about 7
385 × 6.8 is about 380 × 7 or 2660

$$\begin{array}{r} 385 \\ 6.8 \\ \hline 3080 \\ 2310 \\ \hline 2618.0 \end{array}$$

Think	Record
40	0
64, 68	8
24, 30	30
30	0, one place left
48, 51	1
18, 23	23

Why is the decimal point placed as shown?

IN ACTION

1. Complete to estimate the product.
   a) 129 × 3.7 is about 130 × 4 or ?
   b) 219 × 9.7 is about 220 × 10 or ?
   c) 341 × 6.8 is about ? × ? or ?
   d) 199 × 9.1 is about ? × ? or ?

2. Find the products.
   a) 119 × 2.3 b) 197 × 3.9 c) 211 × 4.8 d) 301 × 6.9 e) 439 × 7.1
   f) 348 × 2.8 g) 401 × 5.1 h) 492 × 8.3 i) 509 × 5.4 j) 597 × 9.1

3. If 1 ℓ of regular gasoline costs 22.9¢, find the cost of 48 ℓ.

4. Find the cost of 48 ℓ of premium grade gasoline at 26.9¢/ℓ.

5. How much more expensive is 48 ℓ of premium gasoline than the same amount of regular gasoline?

Multiply 27.5 by 8.4.

27.5 × 8.4 is about 30 × 8 or 240

$$\begin{array}{r} 27.5 \\ 8.4 \\ \hline 1100 \\ 2200 \\ \hline 231.00 \end{array}$$

Multiply 2.75 by 8.4.

2.75 × 8.4 is about 3 × 8 or 24

$$\begin{array}{r} 2.75 \\ 8.4 \\ \hline 1100 \\ 2200 \\ \hline 23.100 \end{array}$$

Think	Record
20,	0
28,30	0
8,11,	11
40	0 one place left
56,60	0
16, 22	22

Place the decimal points as shown.

Check: In each case, how many digits are there after the decimal point in the 2 factors? How many digits are there after the decimal point in the product?

IN ACTION

1. How many digits would there be after the decimal point in each product?

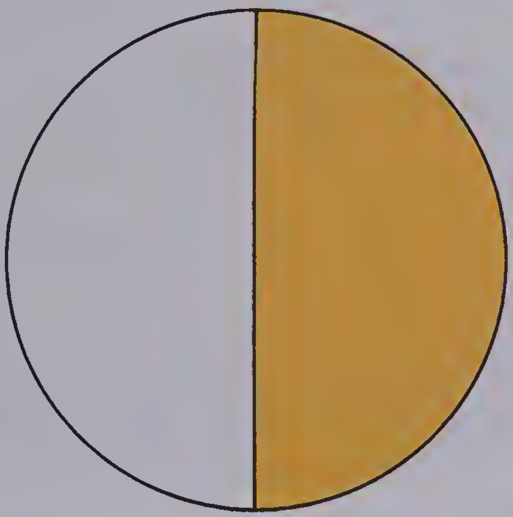
a) 19.8 × 3.7
b) 1.98 × 3.7
c) 49.6 × 0.8
d) 4.96 × 0.8
e) 37.4 × 6
f) 59.8 × 0.7
g) 6.83 × 9
h) 37.4 × 7.2

2. Find the products.

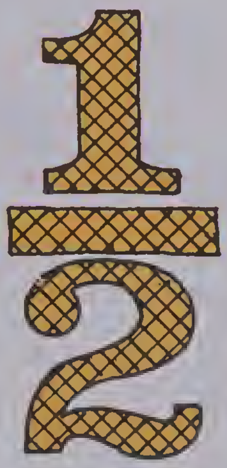
a) 17.4 × 2.5
b) 31.3 × 4.6
c) 4.67 × 3.1
d) 5.84 × 4.7
e) 67.1 × 5.4
f) 73.9 × 2.8
g) 8.14 × 7.2
h) 9.28 × 6.9
i) 49.2 × 6.1
j) 87.3 × 2.9
k) 9.41 × 8.6
l) 86.7 × 4.8

3. Burlap for school banners costs $1.98/m. Find the cost of 6.5 m.

FRACTIONS/Numerator and Denominator



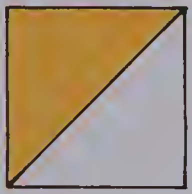
The **numerator** tells the number of equal parts to be considered.

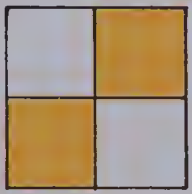


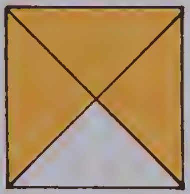
The **denominator** tells the number of equal parts.

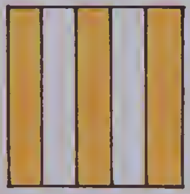
IN ACTION

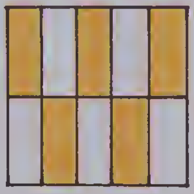
1. Write the numerator.

a) 

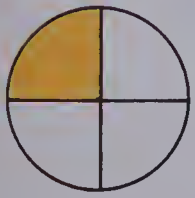
b) 

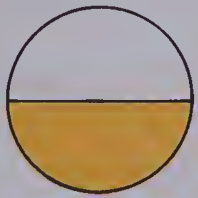
c) 

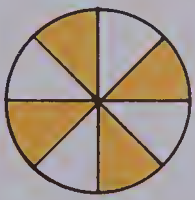
d) 

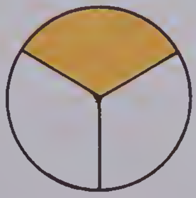
e) 

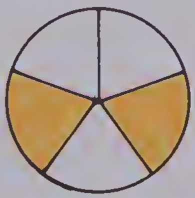
2. Write the denominator.

a) 

b) 

c) 

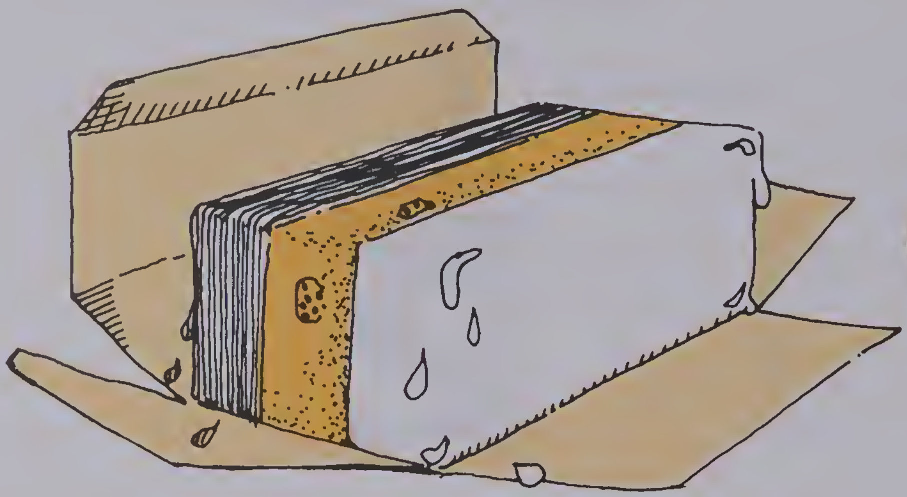
d) 

e) 

3. Write a fraction for each of the following.

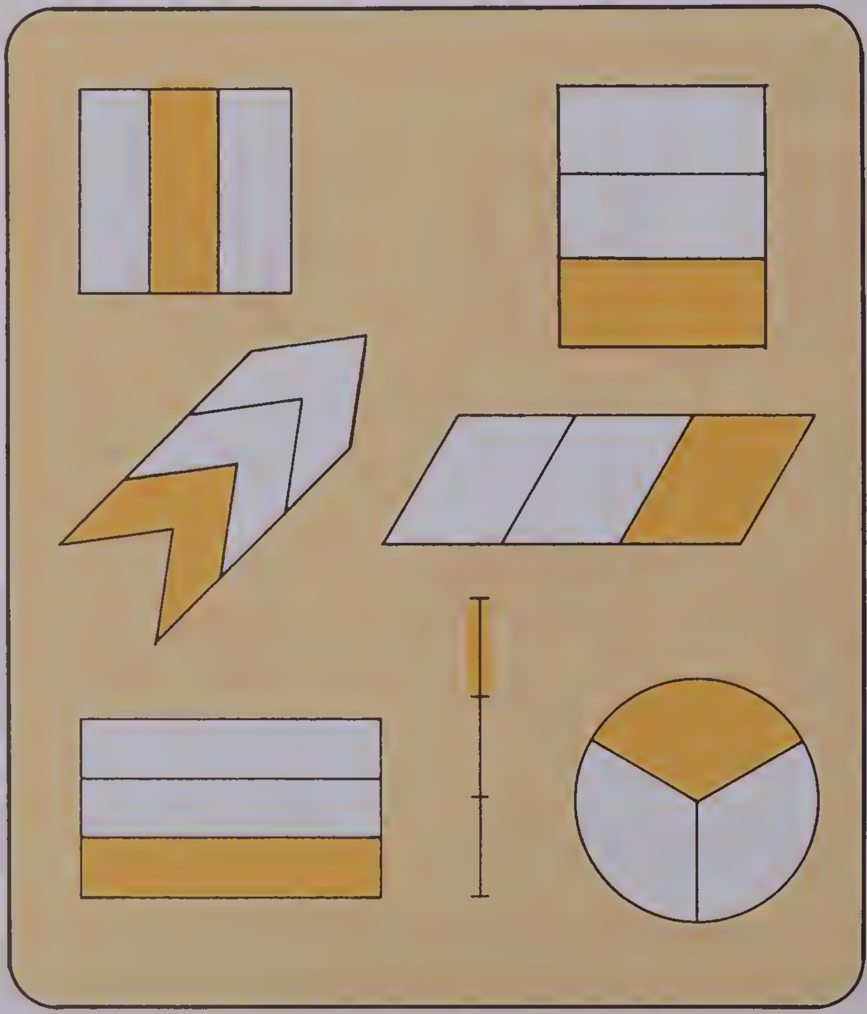
a) the denominator is twice the numerator
b) the numerator is greater than the denominator
c) the denominator is less than the numerator
d) the denominator is 1 greater than the numerator

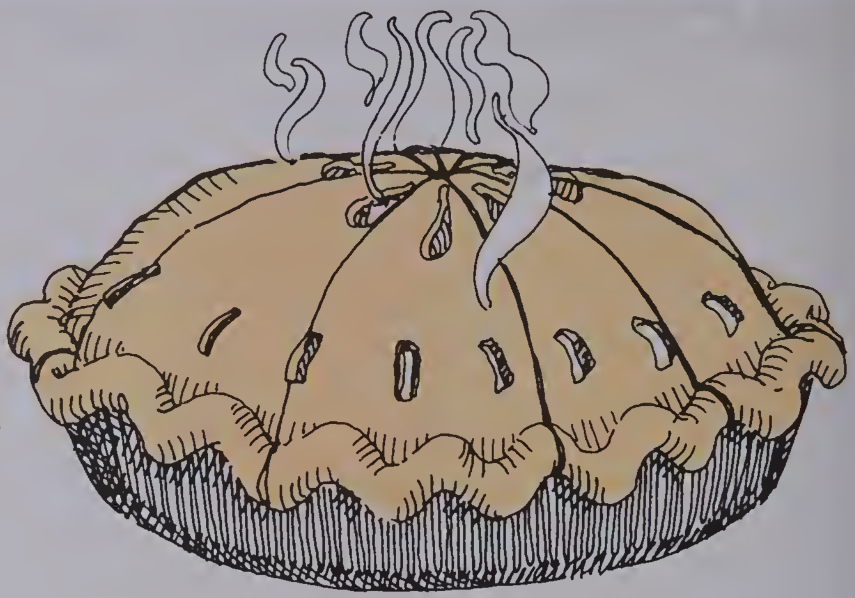
Thirds, Eighths



1 brick of Neapolitan ice cream
3 equal parts
each part shows $\frac{1}{3}$

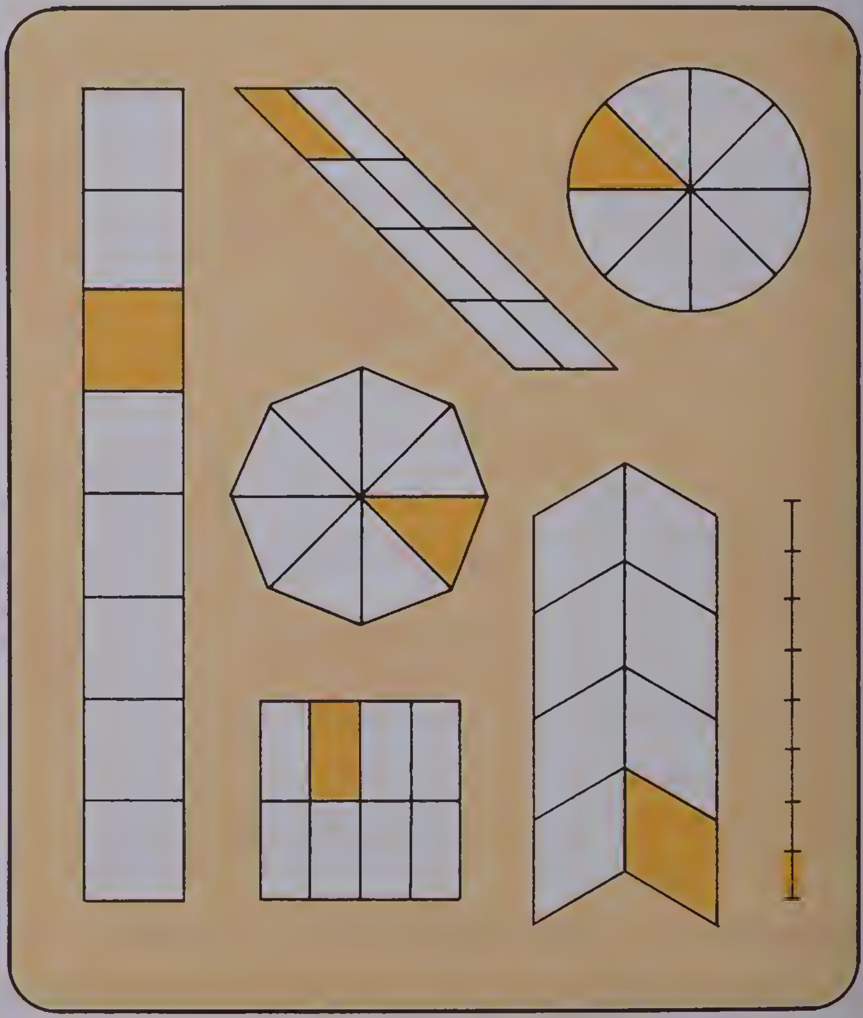
These diagrams each show $\frac{1}{3}$





1 apple pie
8 equal parts
each part shows $\frac{1}{8}$

These diagrams each show $\frac{1}{8}$

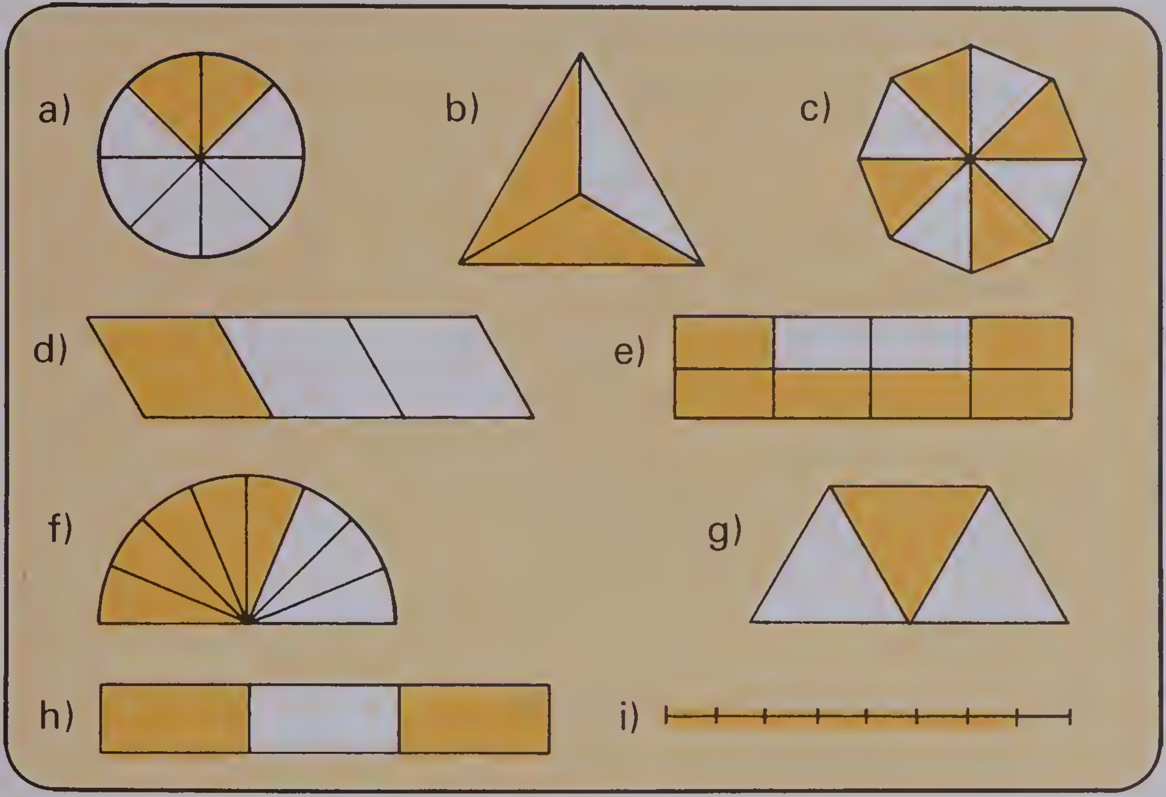


IN ACTION

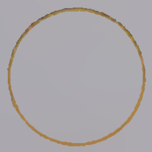
1. For each diagram:
   write the number of equal parts,

   write the fraction that each part shows,

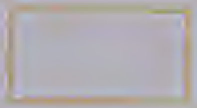
   write the fraction that shows what part is shaded.

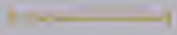


2. Use a figure like the one given to show the fraction.

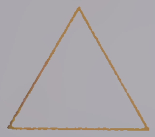
a) $\frac{2}{8}$ 

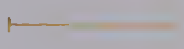
b) $\frac{5}{8}$

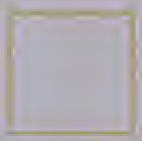
c) $\frac{2}{3}$ 

d) $\frac{1}{8}$ 

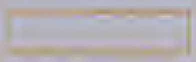
e) $\frac{3}{3}$

f) $\frac{1}{3}$ 

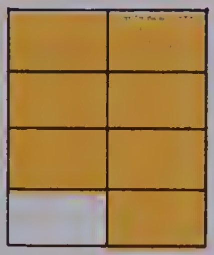
g) $\frac{7}{8}$ 

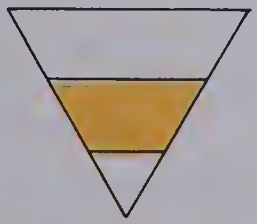
h) $\frac{3}{8}$ 

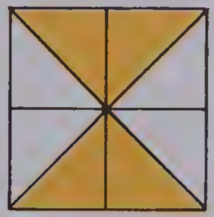
i) $\frac{4}{8}$

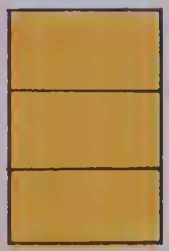
j) $\frac{1}{3}$ 

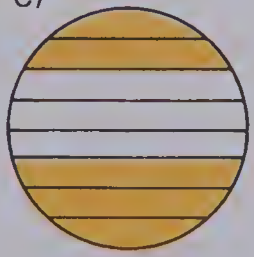
3. Does the diagram show the fraction?

a) 
$\frac{7}{8}$

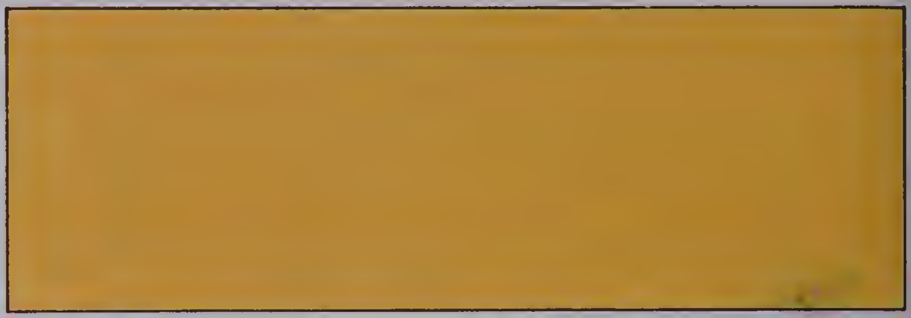
b) 
$\frac{1}{3}$

c) 
$\frac{4}{8}$

d) 
$\frac{3}{3}$

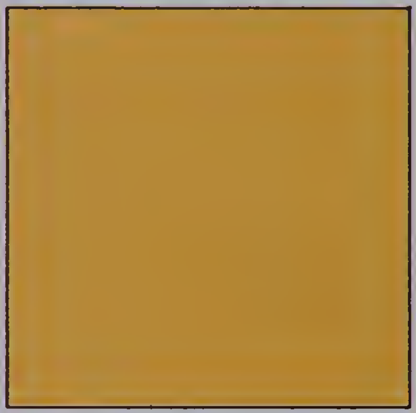
e) 
$\frac{5}{8}$

4. a) Trace this rectangular shape.
   Divide it into 3 equal parts.
   Show $\frac{2}{3}$.



   b) Can you divide a rectangular shape into 3 equal parts in different ways?
   Draw diagrams of the different ways you found.

5. a) Trace this square shape.
   Divide it into 8 equal parts.
   Show $\frac{5}{8}$.



   b) Can you divide a square shape into 8 equal parts in different ways?
   Draw diagrams of the different ways you found.

6. a) Draw a line segment 8 cm long.
   Show $\frac{3}{8}$.

   b) Draw a line segment 6 cm long.
   Show $\frac{2}{3}$.

   c) Draw a line segment 8 cm long.
   Show $\frac{6}{8}$.

   d) Draw a line segment 6 cm long.
   Show $\frac{1}{3}$.

   e) Draw a line segment 4 cm long.
   Show $\frac{8}{8}$.

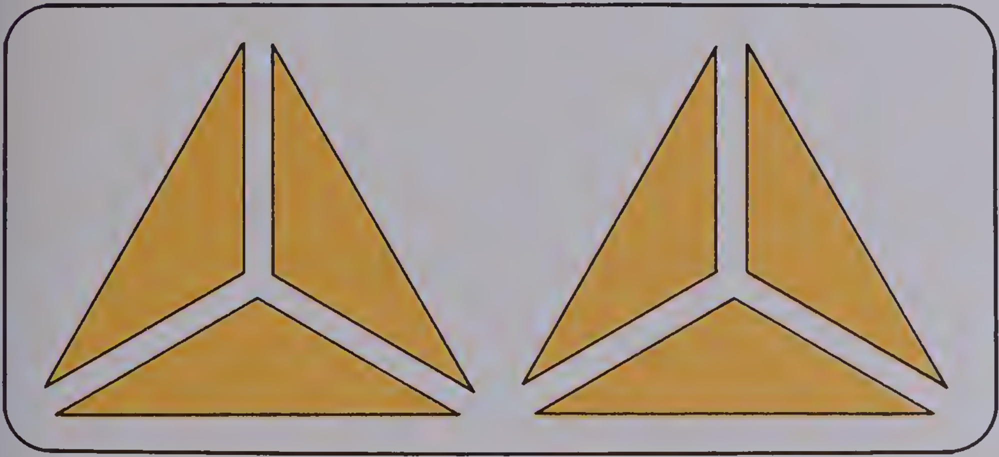
   f) Draw a line segment 4 cm long.
   Show $\frac{1}{8}$.

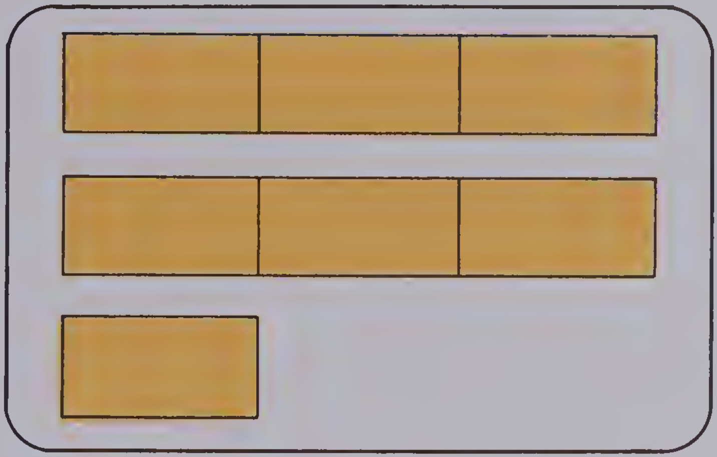
   g) Draw a line segment 8 cm long.
   Show $\frac{5}{8}$.

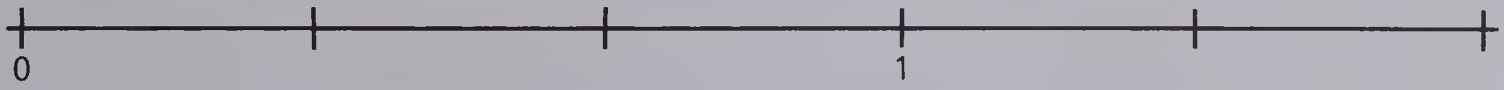
   h) Draw a line segment 3 cm long.
   Show $\frac{3}{3}$.

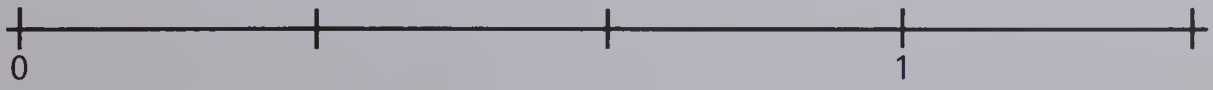
Thirds and Eighths Greater Than 1

How many thirds?

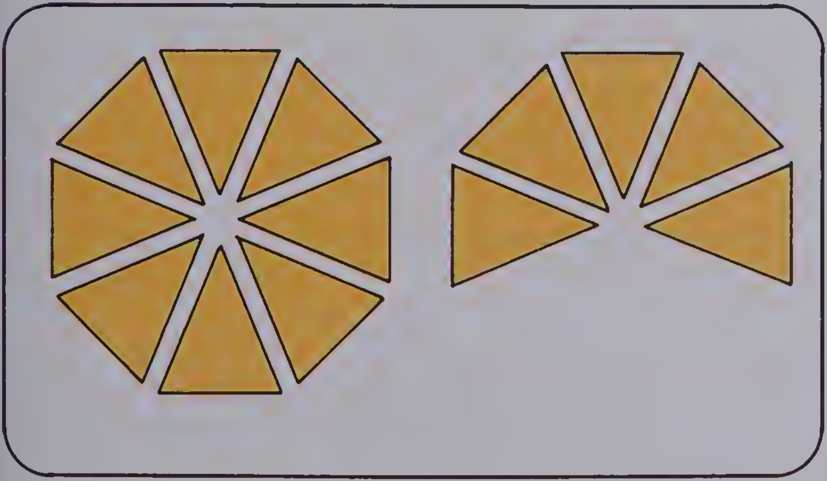


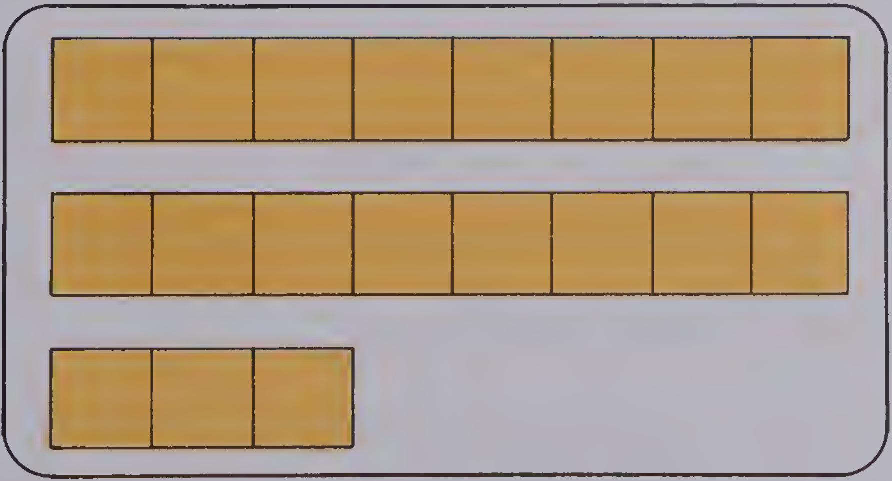


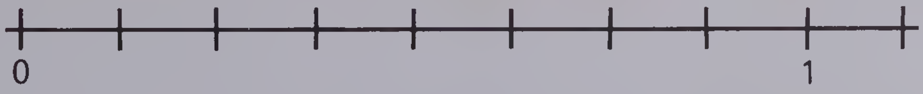


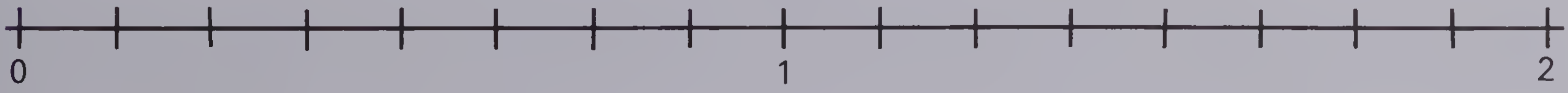


How many eighths?



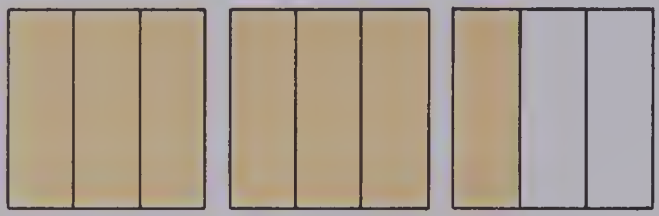


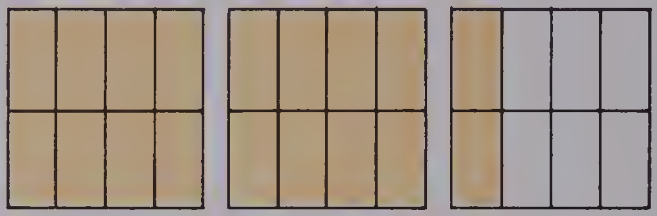


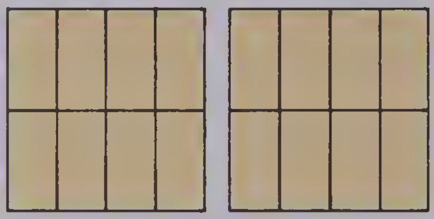


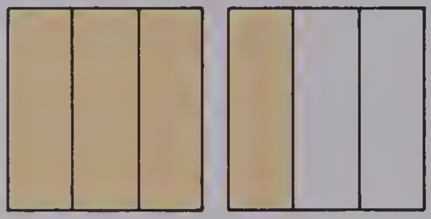
IN ACTION

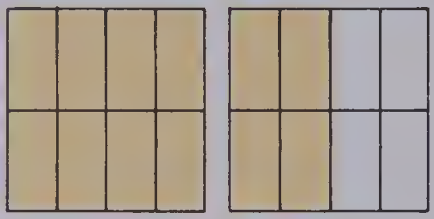
1. Write a fraction for each illustration.

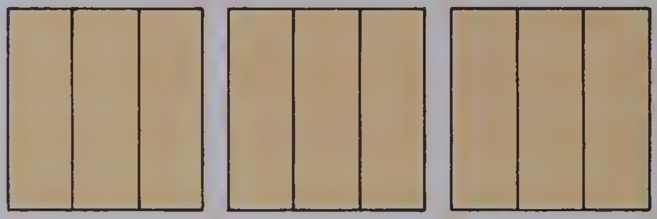
a)


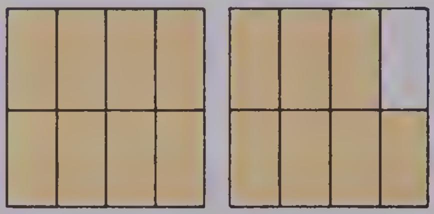
b)


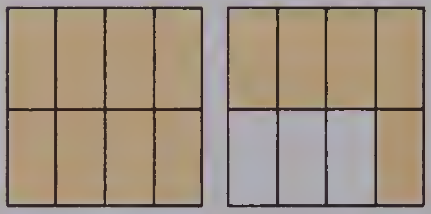
c)


d)


e)


f)


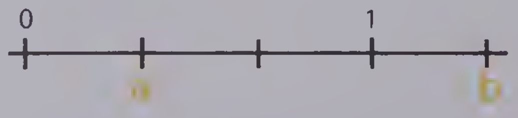
g)


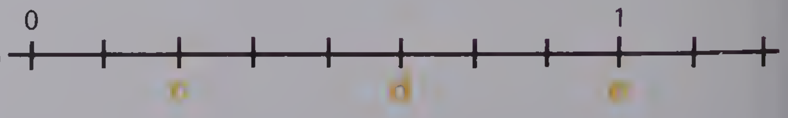
h)


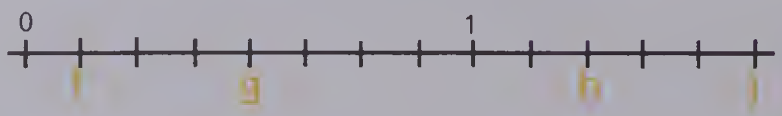
2. Illustrate each fraction.

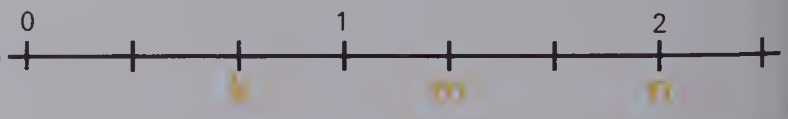
a) $\frac{9}{8}$ b) $\frac{5}{3}$ c) $\frac{14}{8}$ d) $\frac{8}{3}$ e) $\frac{10}{8}$ f) $\frac{6}{3}$ g) $\frac{17}{8}$ h) $\frac{11}{8}$

3. Write a fraction for each point marked on the number line.

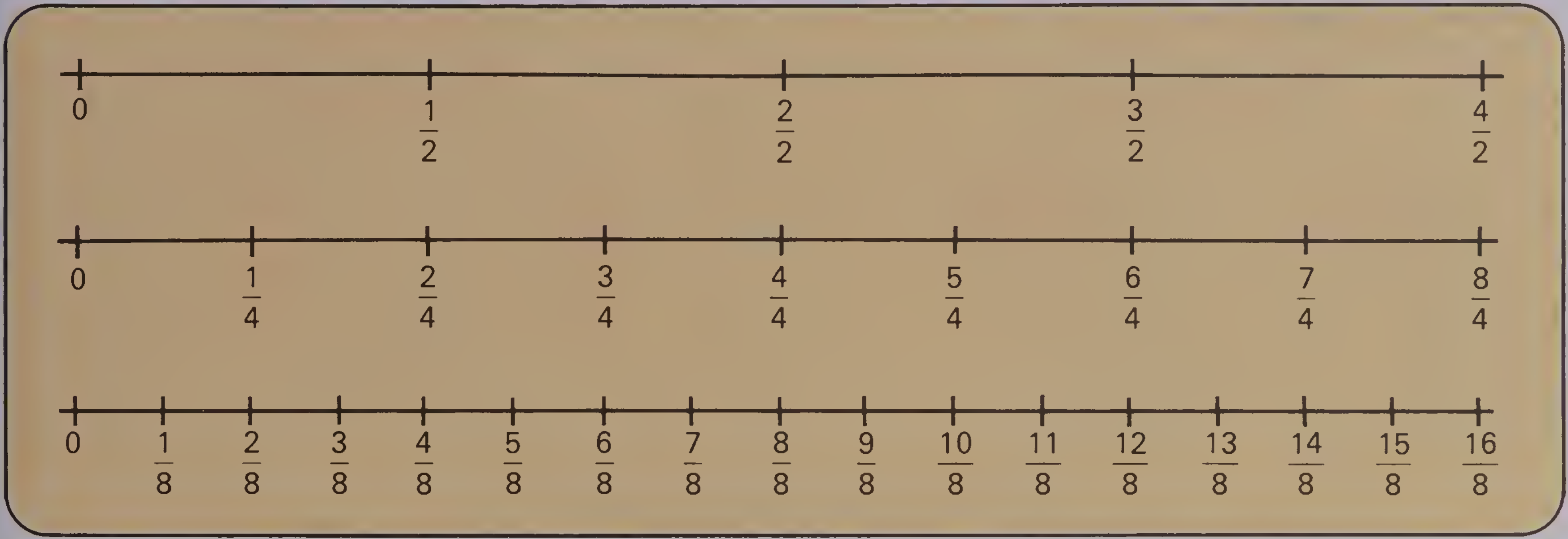
a)


b)


c)


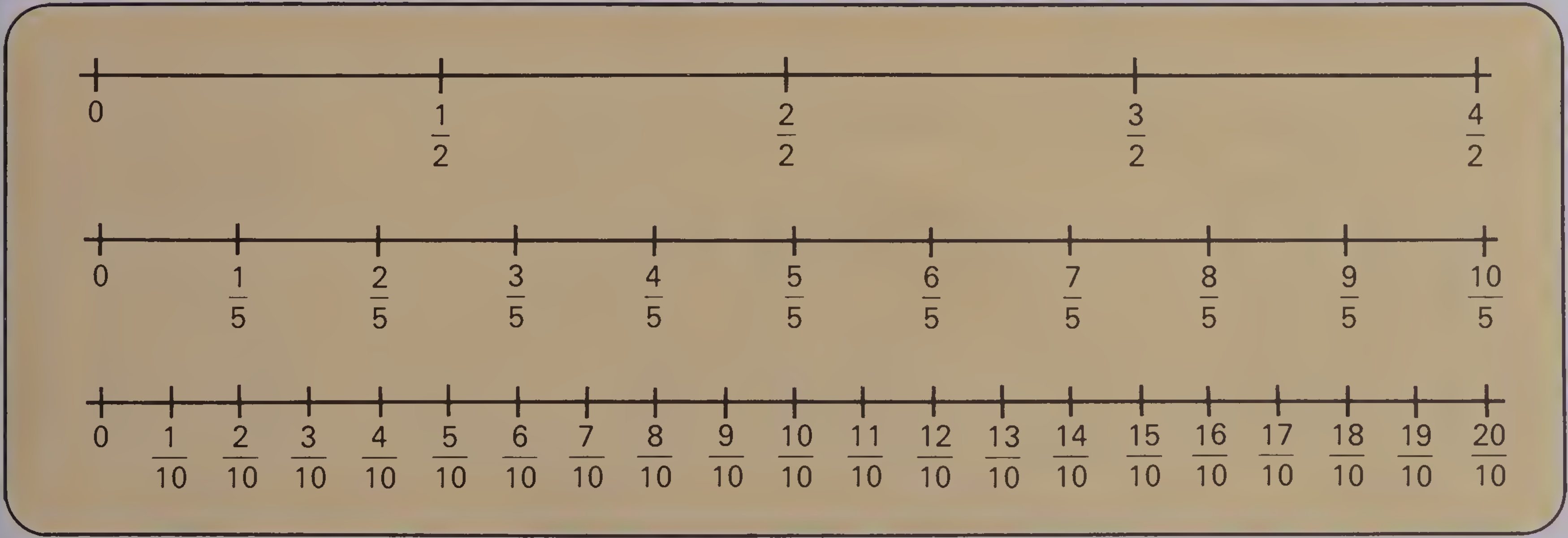
d)


More About Equivalent Fractions


0
1/2
2/2
3/2
4/2
0
1/4
2/4
3/4
4/4
5/4
6/4
7/4
8/4
0
1/8
2/8
3/8
4/8
5/8
6/8
7/8
8/8
9/8
10/8
11/8
12/8
13/8
14/8
15/8
16/8

From this equivalent fraction chart we see that

a) $\frac{1}{4} = \frac{2}{8}$ b) $\frac{1}{2} = \frac{2}{?} = ?$ c) $\frac{2}{2} = ? = ?$ d) $\frac{14}{8} = ?$


0
1/2
2/2
3/2
4/2
0
1/5
2/5
3/5
4/5
5/5
6/5
7/5
8/5
9/5
10/5
0
1/10
2/10
3/10
4/10
5/10
6/10
7/10
8/10
9/10
10/10
11/10
12/10
13/10
14/10
15/10
16/10
17/10
18/10
19/10
20/10

From this equivalent fraction chart we see that

a) $\frac{2}{5} = \frac{4}{10}$ b) $\frac{10}{10} = ? = ?$ c) $\frac{15}{10} = ?$ d) $\frac{12}{10} = ?$

IN ACTION

1. Use the number lines on page 231 to complete the equations.

a) $\frac{1}{2} = \frac{?}{4}$ b) $\frac{8}{10} = \frac{4}{?}$ c) $\frac{2}{?} = \frac{4}{8}$ d) $\frac{6}{10} = \frac{?}{5}$ e) $\frac{4}{8} = \frac{5}{?}$

f) $\frac{?}{10} = \frac{2}{5}$ g) $\frac{?}{2} = \frac{4}{8}$ h) $\frac{2}{10} = \frac{1}{?}$ i) $\frac{1}{2} = \frac{?}{10}$ j) $\frac{?}{8} = \frac{7}{4}$

k) $\frac{2}{4} = \frac{?}{10}$ l) $\frac{10}{?} = \frac{5}{4}$ m) $\frac{2}{?} = \frac{4}{4}$ n) $\frac{6}{8} = \frac{3}{?}$ o) $\frac{?}{4} = \frac{5}{5}$

p) $\frac{?}{2} = \frac{20}{10}$ q) $\frac{2}{2} = \frac{5}{?}$ r) $\frac{12}{?} = \frac{15}{10}$ s) $\frac{?}{2} = \frac{8}{8}$ t) $\frac{1}{4} = \frac{?}{8}$

2. Match equivalent fractions.

$\frac{15}{10}$ $\frac{2}{2}$ $\frac{6}{4}$ $\frac{1}{4}$ $\frac{7}{4}$ $\frac{14}{8}$ $\frac{16}{8}$ $\frac{6}{4}$ $\frac{4}{2}$ $\frac{8}{8}$ $\frac{10}{5}$ $\frac{10}{10}$ $\frac{4}{2}$

$\frac{2}{4}$ $\frac{20}{10}$ $\frac{3}{2}$ $\frac{16}{8}$ $\frac{5}{10}$ $\frac{4}{4}$ $\frac{8}{4}$ $\frac{16}{8}$ $\frac{3}{5}$ $\frac{10}{5}$ $\frac{1}{2}$ $\frac{4}{8}$ $\frac{12}{8}$ $\frac{12}{8}$ $\frac{2}{8}$ $\frac{6}{10}$ $\frac{8}{4}$

3. Select from the set the fraction equivalent to the first fraction.

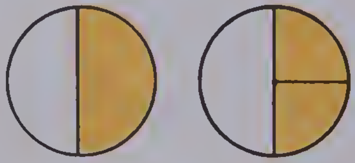
a) $\frac{3}{2}$ $\left(\frac{2}{3}, \frac{15}{10}, \frac{9}{4}\right)$ b) $\frac{16}{8}$ $\left(\frac{4}{2}, \frac{5}{10}, \frac{8}{2}\right)$ c) $\frac{1}{2}$ $\left(\frac{3}{5}, \frac{4}{8}, \frac{6}{10}\right)$

d) $\frac{4}{4}$ $\left(\frac{7}{8}, \frac{3}{2}, \frac{5}{5}\right)$ e) $\frac{1}{5}$ $\left(\frac{2}{10}, \frac{1}{3}, \frac{4}{10}\right)$ f) $\frac{5}{10}$ $\left(\frac{5}{5}, \frac{10}{5}, \frac{2}{4}\right)$

g) $\frac{6}{3}$ $\left(\frac{1}{2}, \frac{16}{8}, \frac{4}{8}\right)$ h) $\frac{1}{4}$ $\left(\frac{2}{8}, \frac{4}{4}, \frac{4}{10}\right)$ i) $\frac{7}{5}$ $\left(\frac{7}{10}, \frac{3}{2}, \frac{14}{10}\right)$

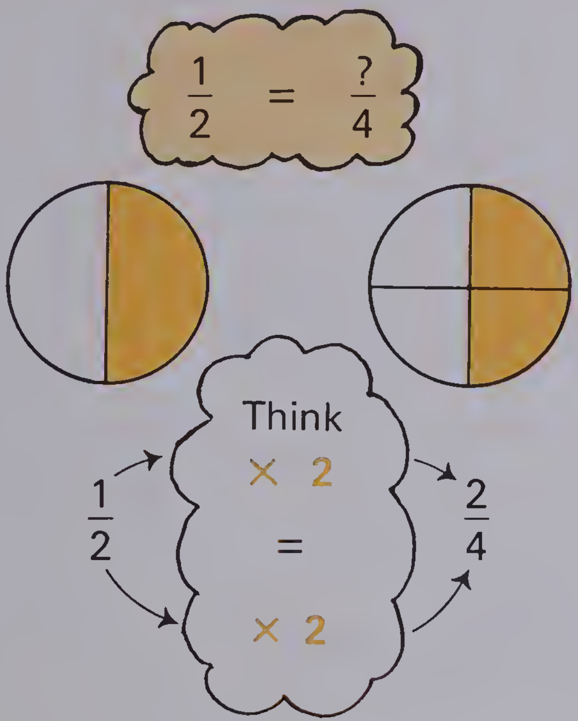
4. Use the given shape to show that the fractions are equivalent.

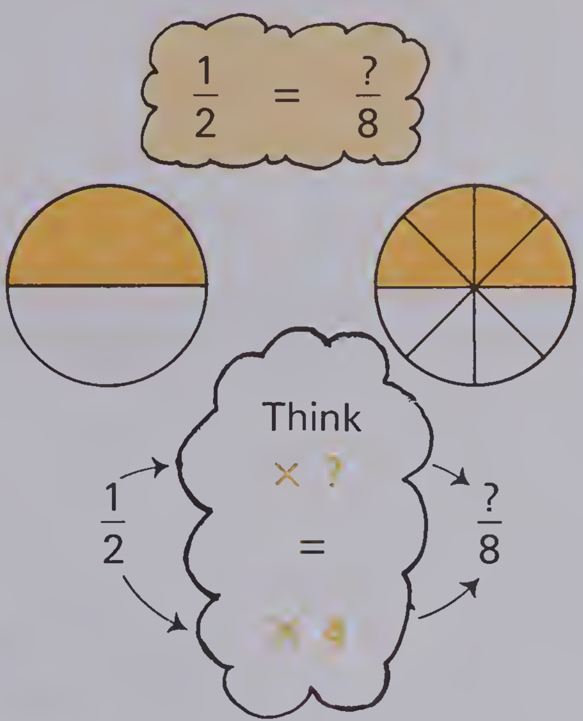
a) $\frac{1}{2}, \frac{2}{4}$



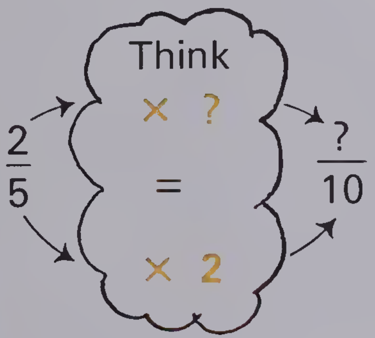
b) $\frac{3}{4}, \frac{6}{8}$ c) $\frac{3}{3}, \frac{4}{4}$ d) $\frac{2}{4}, \frac{5}{10}$ e) $\frac{4}{10}, \frac{2}{5}$

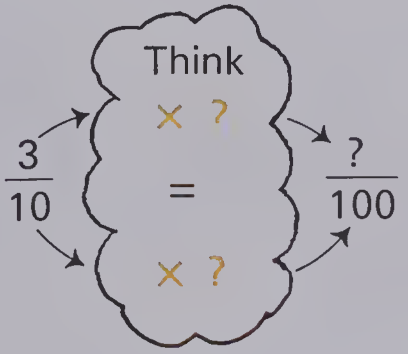
Building Equivalent Fractions by Multiplication


1/2 = ?/4
Think
× 2
=
× 2
1/2
2/4


1/2 = ?/8
Think
× ?
=
× 4
1/2
?/8

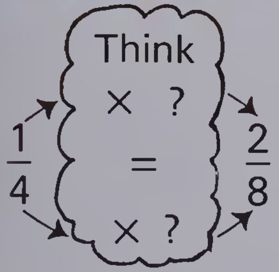
To find the equivalent fraction, multiply the numerator by the same number used to multiply the denominator.

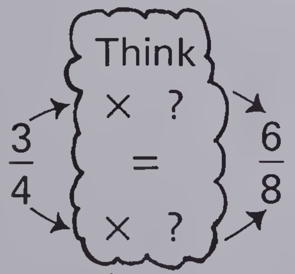

Think
× ?
=
× 2
2/5
?/10

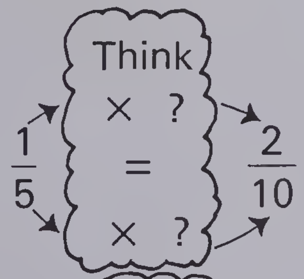

Think
× ?
=
× ?
3/10
?/100

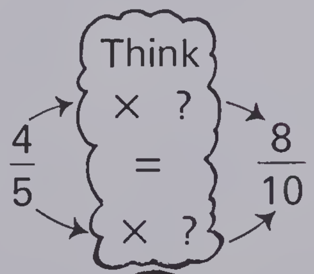
IN ACTION

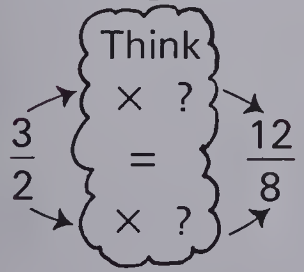
1. What factor would you use?

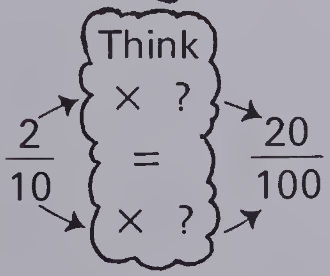
a)


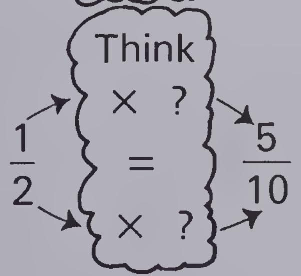
b)


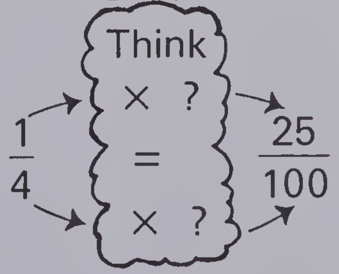
c)

Think
× ?
=
× ?
1/5
2/10

d)

Think
× ?
=
× ?
4/5
8/10

e)

Think
× ?
=
× ?
3/2
12/8

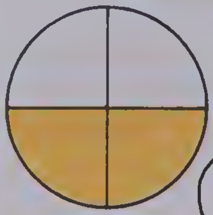
f)

Think
× ?
=
× ?
2/10
20/100

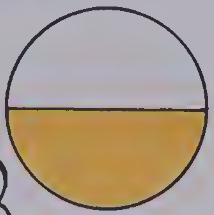
g)

Think
× ?
=
× ?
1/2
5/10

h)

Think
× ?
=
× ?
1/4
25/100

Building Equivalent Fractions by Division

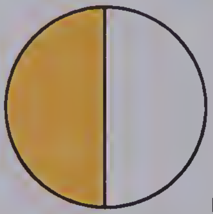
$\frac{2}{4} = \frac{?}{2}$

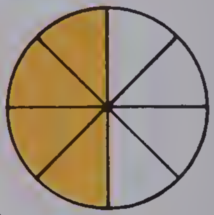




Think $\frac{2}{4} \xrightarrow[\div\ 2]{\div\ 2} \frac{1}{2}$

$\frac{4}{8} = \frac{?}{2}$





Think $\frac{4}{8} \xrightarrow[\div\ 4]{\div\ ?} \frac{?}{2}$

To find the equivalent fraction, divide the numerator by the same number used to divide the denominator .

Think $\frac{4}{10} \xrightarrow[\div\ 2]{\div\ ?} \frac{?}{5}$

Think $\frac{30}{100} \xrightarrow[\div\ ?]{\div\ ?} \frac{?}{10}$

IN ACTION

1. What factor would you use?

a) Think $\frac{4}{8} \xrightarrow[\div\ ?]{\div\ ?} \frac{2}{4}$

b) Think $\frac{6}{10} \xrightarrow[\div\ ?]{\div\ ?} \frac{3}{5}$

c) Think $\frac{12}{8} \xrightarrow[\div\ ?]{\div\ ?} \frac{6}{4}$

d) Think $\frac{5}{10} \xrightarrow[\div\ ?]{\div\ ?} \frac{1}{2}$

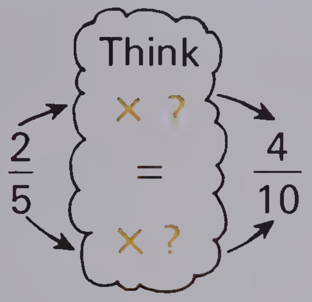
e) Think $\frac{40}{100} \xrightarrow[\div\ ?]{\div\ ?} \frac{4}{10}$

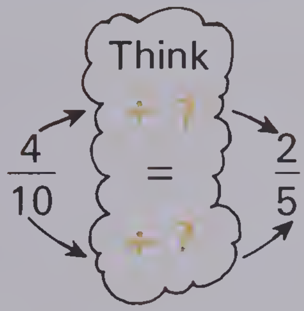
f) Think $\frac{20}{100} \xrightarrow[\div\ ?]{\div\ ?} \frac{1}{5}$

g) Think $\frac{10}{10} \xrightarrow[\div\ ?]{\div\ ?} \frac{5}{5}$

h) Think $\frac{50}{100} \xrightarrow[\div\ ?]{\div\ ?} \frac{1}{2}$

Equivalent Fractions

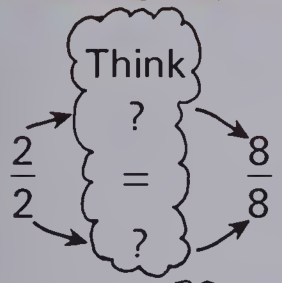

Think
$\frac{2}{5}$
× ?
=
× ?
$\frac{4}{10}$

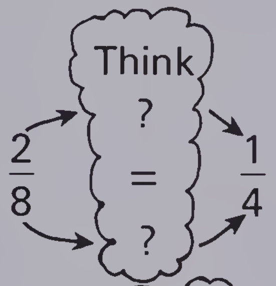

Think
$\frac{4}{10}$
÷ ?
=
÷ ?
$\frac{2}{5}$

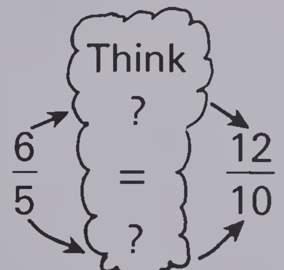
To find the equivalent fraction, we can multiply or divide both the numerator and denominator by the same number.

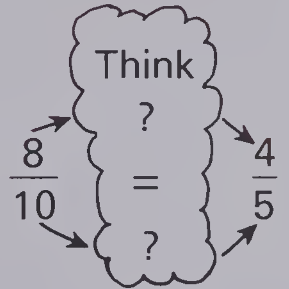
IN ACTION

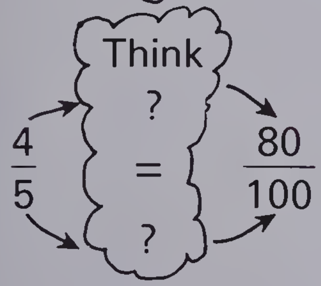
1. State the factor and the operation (× or ÷).

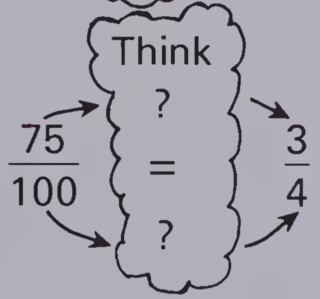
a) 
Think
$\frac{2}{2}$
?
=
?
$\frac{8}{8}$

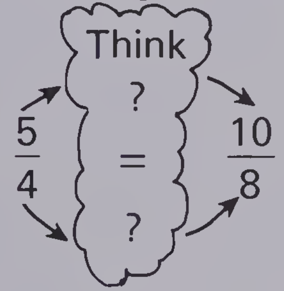
b) 
Think
$\frac{2}{8}$
?
=
?
$\frac{1}{4}$

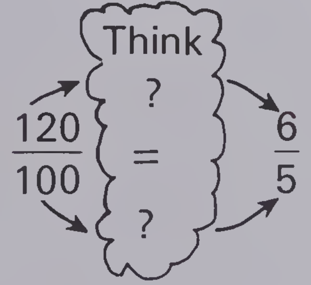
c) 
Think
$\frac{6}{5}$
?
=
?
$\frac{12}{10}$

d) 
Think
$\frac{8}{10}$
?
=
?
$\frac{4}{5}$

e) 
Think
$\frac{4}{5}$
?
=
?
$\frac{80}{100}$

f) 
Think
$\frac{75}{100}$
?
=
?
$\frac{3}{4}$

g) 
Think
$\frac{5}{4}$
?
=
?
$\frac{10}{8}$

h) 
Think
$\frac{120}{100}$
?
=
?
$\frac{6}{5}$

2. Complete.

a) $\frac{5}{10} = \frac{?}{2}$ b) $\frac{2}{2} = \frac{?}{8}$ c) $\frac{30}{100} = \frac{?}{10}$ d) $\frac{10}{8} = \frac{?}{4}$ e) $\frac{4}{5} = \frac{?}{10}$

f) $\frac{40}{100} = \frac{?}{5}$ g) $\frac{2}{4} = \frac{?}{8}$ h) $\frac{25}{100} = \frac{?}{4}$ i) $\frac{4}{2} = \frac{?}{4}$ j) $\frac{12}{8} = \frac{?}{2}$

3. Select from the set the fractions equivalent to the first fraction.

a) $\frac{1}{2}$
d) $\frac{20}{100}$

$\frac{1}{4}$ $\frac{4}{8}$ $\frac{2}{10}$ $\frac{5}{10}$ $\frac{1}{5}$ $\frac{2}{4}$ $\frac{3}{5}$

b) $\frac{5}{10}$
e) $\frac{3}{4}$

$\frac{60}{100}$ $\frac{75}{100}$ $\frac{2}{4}$ $\frac{4}{8}$ $\frac{1}{2}$ $\frac{6}{8}$ $\frac{50}{100}$

c) $\frac{2}{5}$
f) $\frac{2}{8}$

$\frac{3}{2}$ $\frac{4}{10}$ $\frac{1}{4}$ $\frac{10}{100}$ $\frac{3}{4}$ $\frac{9}{10}$ $\frac{40}{100}$ $\frac{7}{10}$

Adding and Subtracting Fractions/Unlike Denominators

$\frac{1}{2} + \frac{3}{10} = \ ?$

$\frac{1}{2} = \frac{5}{10}$

$\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$

$\frac{7}{8} - \frac{3}{4} = \ ?$

$\frac{3}{4} = \frac{6}{8}$

$\frac{7}{8} - \frac{6}{8} = \frac{1}{8}$

IN ACTION

1. Add. Use equivalent fractions.

a) $\frac{1}{2} + \frac{2}{4}$ b) $\frac{1}{4} + \frac{5}{8}$ c) $\frac{1}{2} + \frac{4}{10}$ d) $\frac{2}{5} + \frac{7}{10}$ e) $\frac{7}{8} + \frac{1}{2}$

f) $\frac{5}{10} + \frac{3}{5}$ g) $\frac{1}{2} + \frac{3}{8}$ h) $\frac{2}{4} + \frac{45}{100}$ i) $\frac{55}{100} + \frac{1}{5}$ j) $\frac{2}{10} + \frac{1}{2}$

2. Subtract. Use equivalent fractions.

a) $\frac{3}{4} - \frac{1}{2}$ b) $\frac{3}{5} - \frac{16}{100}$ c) $\frac{2}{2} - \frac{29}{100}$ d) $\frac{3}{4} - \frac{2}{8}$ e) $\frac{7}{10} - \frac{24}{100}$

f) $\frac{75}{100} - \frac{1}{10}$ g) $\frac{9}{8} - \frac{1}{2}$ h) $\frac{8}{10} - \frac{1}{5}$ i) $\frac{8}{5} - \frac{7}{10}$ j) $\frac{1}{2} - \frac{2}{10}$

3. Find the answers.

a) $\frac{1}{2} + \frac{5}{4}$ b) $\frac{4}{5} - \frac{2}{10}$ c) $\frac{36}{100} + \frac{3}{4}$ d) $\frac{9}{8} - \frac{1}{2}$ e) $\frac{6}{4} + \frac{2}{8}$

f) $\frac{2}{2} + \frac{15}{100}$ g) $\frac{7}{10} - \frac{3}{5}$ h) $\frac{1}{5} + \frac{20}{100}$ i) $\frac{3}{4} - \frac{1}{2}$ j) $\frac{2}{10} + \frac{1}{2}$

4. Which is greater?

a) $\frac{1}{2} + \frac{2}{8}$ or $\frac{13}{8} - \frac{3}{4}$ b) $\frac{4}{5} + \frac{3}{10}$ or $\frac{8}{5} - \frac{60}{100}$

5. Which is less?

a) $\frac{6}{5} - \frac{3}{10}$ or $\frac{11}{100} + \frac{1}{2}$ b) $\frac{4}{8} + \frac{2}{4}$ or $\frac{3}{2} - \frac{6}{10}$

LONG DIVISION/2-Digit Divisors

Divide 504 by 14.

$$\begin{array}{r} 36 \\ 14\overline{)504} \\ \underline{42} \\ 84 \\ \underline{84} \\ 0 \end{array}$$

Think

How many 14's are there in 50? —About 3

Write 3 above the 0.

14 × 3 = 42 Subtract.

Bring down the 4 beside the 8.

How many 14's are there in 84? —6

Write 6 above the 4.

14 × 6 = 84

Complete .

$$\begin{array}{r} ?? \\ 12\overline{)216} \\ \underline{?} \\ ?6 \\ \underline{?} \end{array}$$

Think

How many 12's are there in 21? —About ?

Write ? above the 1.

12 × 1 = ? Subtract.

Bring down the 6 beside the ?

How many 12's are there in ? —?

Write ? above the 6.

12 × ? = ?

IN ACTION

1. Divide.

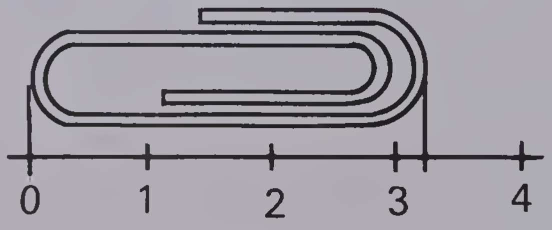
a) $13\overline{)312}$ b) $15\overline{)420}$ c) $16\overline{)432}$ d) $12\overline{)552}$ e) $11\overline{)418}$ f) $14\overline{)546}$

g) $13\overline{)377}$ h) $15\overline{)735}$ i) $19\overline{)399}$ j) $16\overline{)368}$ k) $17\overline{)544}$ l) $18\overline{)810}$

2. There are 252 students in 12 classrooms.
There are the same number of students in each class.
How many students are there in each classroom?

3. The baker has 552 cookies baking in 12 pans.
How many cookies are in each pan?

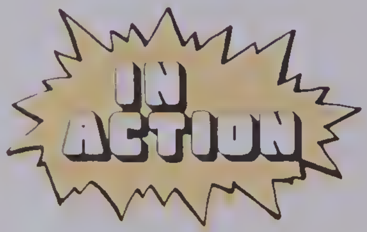
ROUNDING NUMBERS/Rounding Numbers to the Nearest Unit



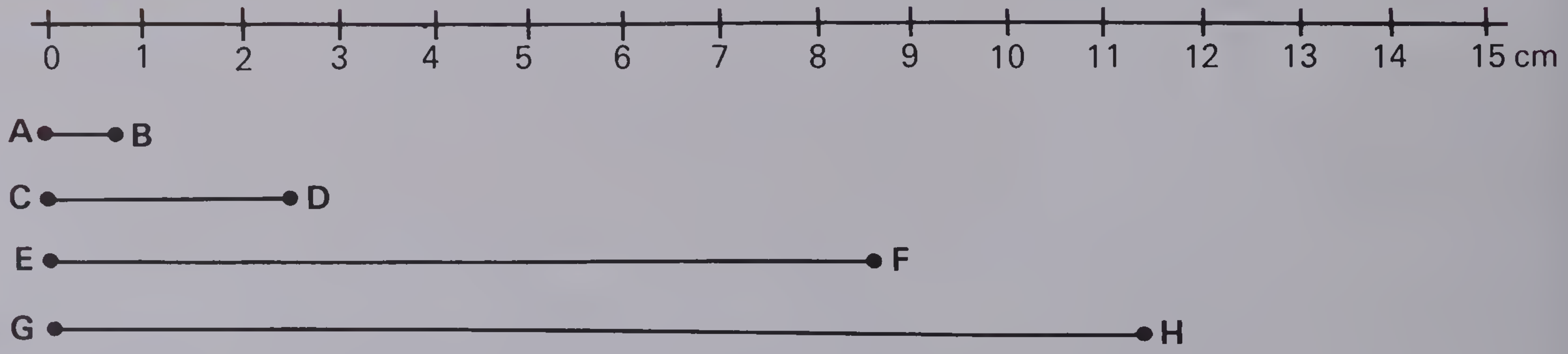
The length of the paper clip is closer to 3 cm than it is to 4 cm.
Length = 3 cm, to the nearest 1 cm
The length of the paper clip is closer to 3.5 cm than it is to 3 cm.
Length = 3.5 cm, to the nearest 0.5 cm

To give approximate answers, we can round numbers.
Think about 4.3 and 4.7.

4.3 is closer to 4 than it is to 5.
4.3 = 4, to the nearest unit
4.7 is closer to 5 than it is to 4.
4.7 = 5, to the nearest unit



1.



Give the length of each line segment
a) to the nearest 1 cm,
b) to the nearest 0.5 cm.

2. Round each number to the nearest unit.

a) 6.1 b) 7.4 c) 8.6 d) 9.8 e) 27.3 f) 35.7 g) 41.9
h) 53.2 i) 67.4 j) 70.2 k) 85.9 l) 275.2 m) 649.9 n) 763.4

Rounding Numbers to the Nearest Tenth

Think about

4.63 and 4.68

3 < 5 8 > 5

4.65 is halfway between 4.6 and 4.7.

4.63 = 4.6, to the nearest tenth 4.68 = 4.7, to the nearest tenth

IN ACTION

1. Which of these are closer to 3.4 than to 3.5?
   a) 3.41 b) 3.48 c) 3.49 d) 3.42 e) 3.47 f) 3.46

2. Round each number to the nearest tenth.
   a) 5.64 b) 7.29 c) 1.18 d) 2.77 e) 8.01 f) 9.08
   g) 19.02 h) 21.06 i) 35.12 j) 49.36 k) 56.24 l) 75.19

3. Add. Round each total to the nearest tenth.

a)	b)	c)	d)	e)
4.94	3.51	6.04	5.32	7.35
3.86	7.24	7.38	8.49	6.46
15.62	8.32	1.01	1.67	2.53

4. Multiply. Round each product to the nearest tenth.

a)	b)	c)	d)	e)
0.7	0.4	0.9	0.1	0.8
0.8	0.3	0.3	0.1	0.8

Quotients to the Nearest Tenth

When we divide 92 by 8, we obtain a quotient of 11 and a remainder of 4.

$$\begin{array}{r} 11 \\ 8\overline{)92} \\ \underline{8} \\ 12 \\ \underline{8} \\ 4 \end{array}$$

We can express the quotient in a different way.

Think of 92 as 92.0 and continue dividing.

The quotient is 11.5.

$$\begin{array}{r} 11.5 \\ 8\overline{)92.0} \\ \underline{8} \\ 12 \\ \underline{8} \\ 40 \\ \underline{40} \end{array}$$

$$\begin{array}{r} 13.14 \\ 7\overline{)92.00} \\ \underline{7} \\ 22 \\ \underline{21} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \end{array}$$

Try one that doesn't come out evenly.
Divide 92 by 7.

In the quotient 13.14, $4 < 5$.

$92 \div 7 = 13.1$, to the nearest tenth

IN ACTION

1. Divide. Write the quotient to the nearest tenth.

   a) $4\overline{)74}$ b) $5\overline{)76}$ c) $3\overline{)82}$ d) $6\overline{)92}$ e) $7\overline{)87}$

   f) $8\overline{)98}$ g) $3\overline{)67}$ h) $4\overline{)86}$ i) $7\overline{)99}$ j) $6\overline{)86}$

2. What is the length of each side of a square, if the perimeter is 74 cm?

3. What is the length of each side of a regular pentagon, if the perimeter is 71 cm?

2-Digit Divisor

Divide 193 by 14.

To find the quotient to the nearest tenth,
we can write 193 as 193.00.

$$\begin{array}{r} 13.78 \\ 14\overline{)193.00} \\ \underline{14} \\ 53 \\ \underline{42} \\ 110 \\ \underline{98} \\ 120 \\ \underline{112} \\ 8 \end{array}$$

Think
How many 14's are there in 19? — About 1
Write 1 above the 9
14 × 1 = 14 Subtract.
Bring down the 3 beside the 5.
How many 14's are there in 53? — About 3
Write the 3 above the 3.
14 × 3 = 42 Subtract.
Place a decimal point in the quotient.
Bring down a 0 beside the 11.
How many 14's are there in 110? — About 7
Write 7 above the 0.
14 × 7 = 98 Subtract.
Bring down a 0 beside the 12.
How many 14's are there in 120? — About 8
Write 8 above the 0.
14 × 8 = 112 Subtract.

For the quotient 13.78,
8 > 5.
13.78 is closer to 13.8 than it is to 13.7.
193 ÷ 14 = 13.8, to the nearest tenth

IN ACTION

1. Complete.

Divide 149 by 12.

```
      ??
12)149.00
    ?
    ?9
     ?
     ?0
      ?
      ?0
```

How many 12's are there in 14? —About ?

How many 12's are there in ? —About ?

How many 12's are there in ? —About ?

How many 12's are there in ? —About ?

149 ÷ 12 = ?, to the nearest tenth

2. Complete.
Divide 375 by 16.

```
    2?.??
16)375.00
   32
    55
     ?
     ?0
      ?
      ?0
       ?
       ?
```

375 ÷ 16 = ? , to the nearest tenth

3. Complete.
Divide 698 by 15.

```
    4?.??
15)698.00
   60
    98
     ?
     ?0
      ?
      ?0
       ?
       ?
```

698 ÷ 15 = ? , to the nearest tenth

4. Complete.
Divide 167 by 16.

     10.??
16)167.00
     16
     070
        ?

167 ÷ 16 = ?, to the nearest tenth

5. Complete.
Divide 428 by 14.

     3?.??
14)428.00
     42

        ?

428 ÷ 14 = ?, to the nearest tenth

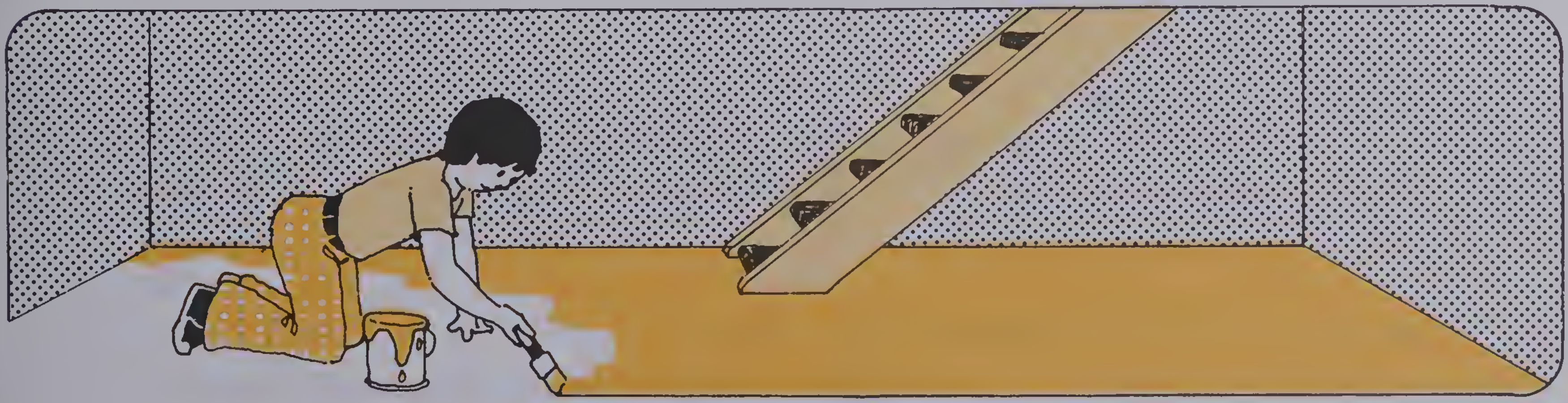
5. Divide. Express the quotient to the nearest tenth.
a) 12)189 b) 13)229 c) 11)205 d) 14)261
e) 15)355 f) 16)393 g) 13)498 h) 15)713

6. Find the quotients, to the nearest tenth.
a) 486 ÷ 14 b) 248 ÷ 12 c) 538 ÷ 15 d) 827 ÷ 16
e) 749 ÷ 12 f) 753 ÷ 15 g) 694 ÷ 13 h) 919 ÷ 13

7. In a 14-h flight, the jet used 143 700 kg of fuel.
About how much fuel did it consume each hour?

8. The apartment building has 12 equal sides.
If the perimeter is 286 m, what is the length of each side?

9. Frank painted the basement floor in 4 h.
The floor has an area of 23 m^2.
How much of the floor did he paint in 1 h?



Unit 3, Check 1

1. The first census taken after the Dominion of Canada was formed in 1867 gave a population count of 3 689 257.
   a) How would you read this number? Write your answer.
   b) Write the expanded form of this number.
   c) Make a place value chart showing this number.

2. Complete the patterns.

a) $4^1 = 4$
$4^2 = 4 \times 4 = 16$
$4^3 = \ ? \ = \ ?$
$4^4 = \ ? \ = \ ?$

b) $6^1 = 6$
$6^2 = 6 \times 6 = 36$
$6^3 = \ ? \ = ?$
$6^4 = \ ? \ = ?$

c) $10^1 = 10$
$10^2 = \ ? = ?$
$10^3 = \ ? = ?$
$10^4 = \ ? = ?$

3. Complete.

a) $7 \times 7 \times 7 \times 7 = 7^{?}$
b) $2^6 = ?$
c) $5^{?} = 625$
d) $9^{?} = 729$
e) $10 \times 10 \times 10 \times 10 \times 10 = 10^{?}$
f) $3^5 = ?$

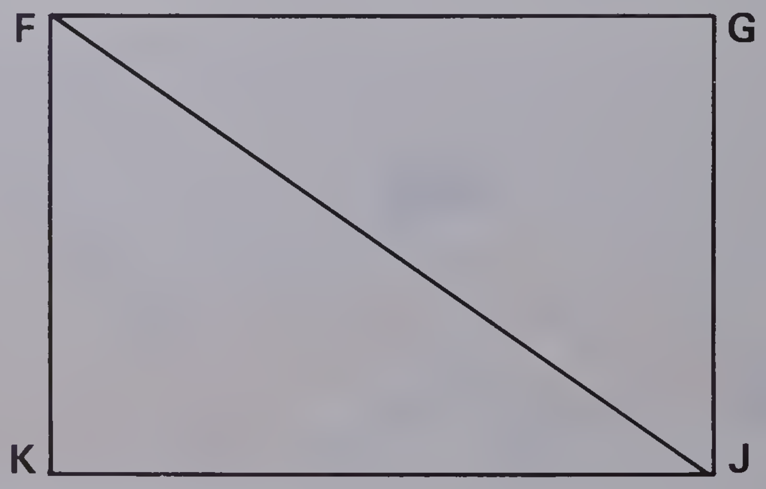
4. Add. Find the difference between the totals in each part.

a)	346	836	b)	$14.28	$ 9.76	c)	14.7	18.2
	1240	946		7.35	18.07		309.8	387.5
	76	3206		9.67	8.49		638.0	574.8
	421	87		32.47	47.56		1642.9	2107.4

5. Complete.

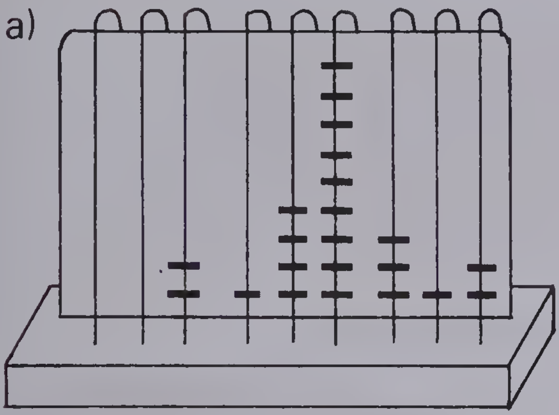
a) 8 dm = ? cm
b) 30 cm = ? dm
c) 3.4 dm = ? cm
d) 48 cm = ? dm
e) 12 dm = ? m
f) 1.5 m = ? dm
g) 6 dm = ? m
h) 0.7 m = ? dm

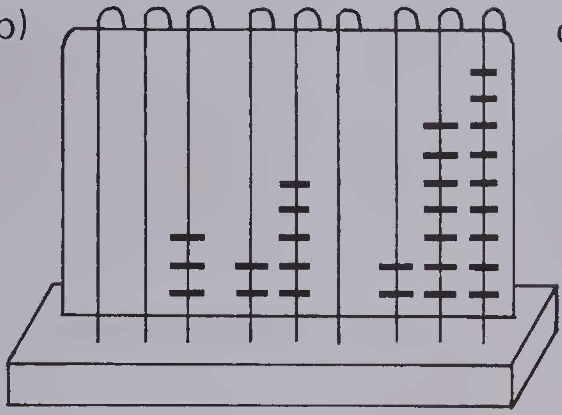
6. Trace this rectangle.
   a) Name the 8 different angles.
   b) Name the right angles.
   c) Name the acute angles.

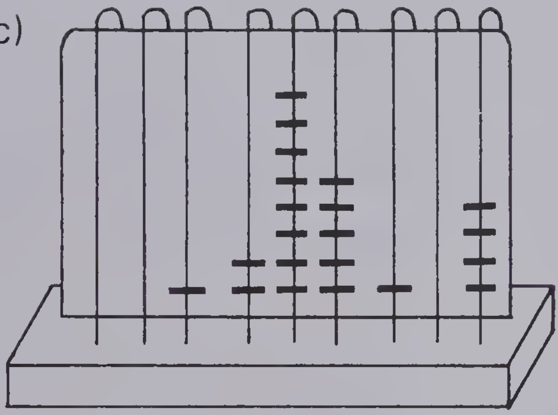


Practice 1

1. Write the meaning for each number shown on the abacus.

a)


b)


c)


2. Write the expanded form for the numbers in Question 1.

3. Write the standard numerals for the numbers in Question 1.

4. Express using exponents.
a) 5×5 b) $2 \times 2 \times 2 \times 2 \times 2$ c) $3 \times 3 \times 3$ d) $7 \times 7 \times 7 \times 7 \times 7$ e) $4 \times 4 \times 4 \times 4$

5. Express using factors.
a) 9^3 b) 7^5 c) 2^9 d) 4^7 e) 2^4 f) 6^2 g) 1^{10} h) 3^5

6. Find the value.
a) 4^5 b) 2^8 c) 3^6 d) 1^9 e) 5^4 f) 6^2 g) 9^3 h) 7^3

7. Add.

a)	b)	c)	d)	e)	f)
14.6	\$1.89	3.38	\$18.47	247.1	\$13.81
34.0	3.47	8.47	6.83	83.6	9.00
8.9	5.06	2.59	1.19	90.5	6.54

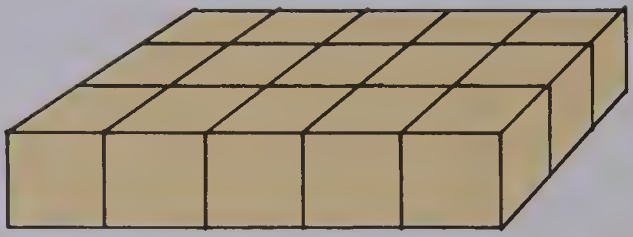
8. Subtract.

a)	b)	c)	d)	e)	f)
19.64	\$24.92	98.00	\$30.40	176.3	\$21.40
7.83	9.95	53.68	18.96	89.5	8.97

9. Complete.
a) 7 dm = ? cm b) 50 cm = ? dm c) 2.5 dm = ? cm d) 52 cm = ? dm
e) 14 dm = ? m f) 2.3 m = ? dm g) 4 dm = ? m i) 0.6 m = ? dm

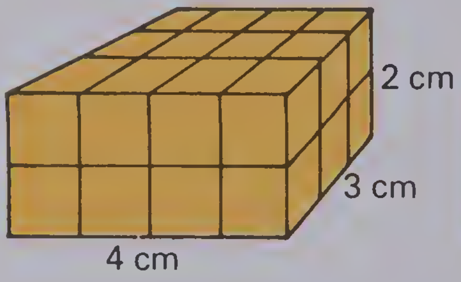
Unit 3, Check 2

1. This structure is made of 1 cm cubes.
   a) What is its volume?
   b) If we build a structure 2 layers high, what is the volume?
   c) If we build a structure 3 layers high, what is the volume?

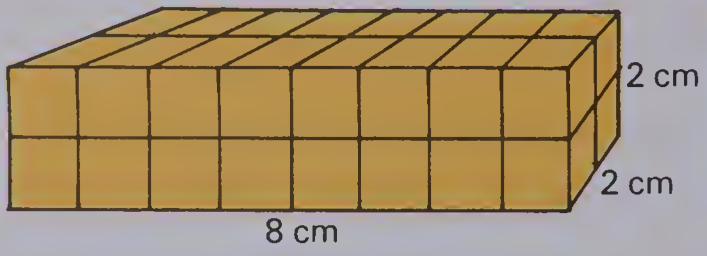


2. Find the volume in cubic centimetres (cm^3) of each structure.

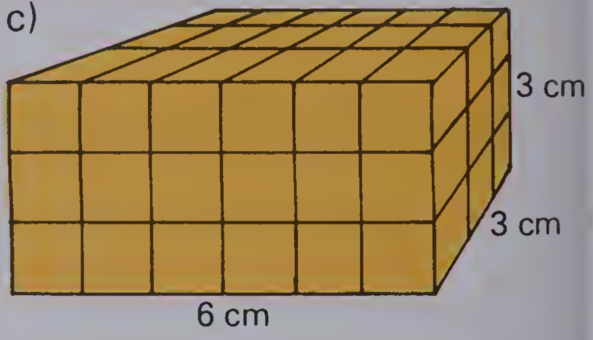
a)



b)



c)



3. Multiply.

a) 24 by 18 b) 46 by 21 c) 27 by 15 d) 52 by 28 e) 76 by 42 f) 96 by 54
g) 79 by 45 h) 68 by 27 i) 88 by 18 j) 91 by 73 k) 65 by 53 l) 84 by 75

4. Multiply.

a) 39	b) 74	c) 59	d) 82	e) 98	f) 64
1.5	3.6	3.3	5.1	7.6	2.9
g) 4.9	h) 8.3	i) 6.4	j) 9.3	k) 8.7	l) 7.2
21	46	23	41	34	58

5. Find the products.

a) 243 × 1.8 b) 391 × 2.4 c) 831 × 5.4 d) 756 × 3.8 e) 649 × 6.1
f) 38.1 × 14 g) 48.3 × 27 h) 94.8 × 22 i) 85.9 × 63 j) 71.5 × 48

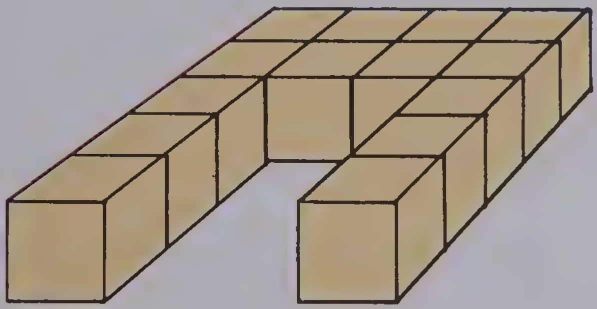
6. Multiply.

a) 34.1	b) 71.7	c) 65.2	d) 47.6	e) 84.1	f) 52.8
2.4	3.4	1.9	2.8	7.4	4.5

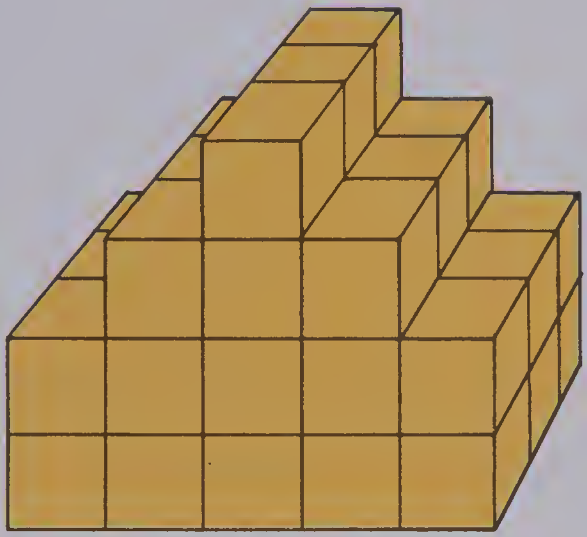
Practice 2

1. Find the volume of each structure. Each cube is 1 cm^3.

a)



b)



2. Multiply.

a) $\begin{array}{r}47\\ \underline{36}\end{array}$ b) $\begin{array}{r}59\\ \underline{25}\end{array}$ c) $\begin{array}{r}38\\ \underline{21}\end{array}$ d) $\begin{array}{r}72\\ \underline{39}\end{array}$ e) $\begin{array}{r}85\\ \underline{45}\end{array}$ f) $\begin{array}{r}94\\ \underline{56}\end{array}$

3. Find the products.

a) 52 × 4.1 b) 64 × 1.5 c) 47 × 3.9 d) 87 × 6.4 e) 96 × 5.4

f) 67 × 2.8 g) 79 × 3.6 h) 56 × 4.1 i) 93 × 3.3 j) 73 × 4.7

4. Multiply.

a) $\begin{array}{r}6.4\\ \underline{32}\end{array}$ b) $\begin{array}{r}7.5\\ \underline{25}\end{array}$ c) $\begin{array}{r}4.7\\ \underline{37}\end{array}$ d) $\begin{array}{r}8.3\\ \underline{52}\end{array}$ e) $\begin{array}{r}9.1\\ \underline{87}\end{array}$ f) $\begin{array}{r}5.4\\ \underline{3.8}\end{array}$

5. Find the products.

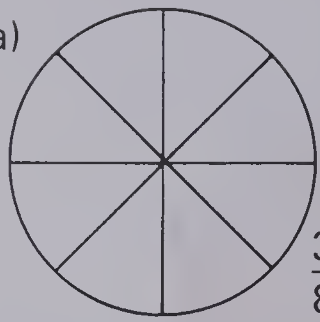
a) 133 × 4.6 b) 237 × 5.9 c) 820 × 3.4 d) 643 × 7.6 e) 437 × 2.7

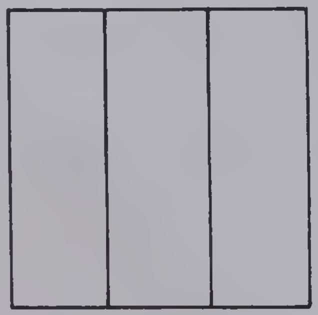
6. Multiply.

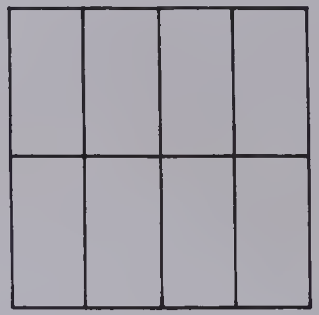
a) $\begin{array}{r}32.4\\ \underline{5.6}\end{array}$ b) $\begin{array}{r}29.4\\ \underline{3.6}\end{array}$ c) $\begin{array}{r}84.5\\ \underline{5.2}\end{array}$ d) $\begin{array}{r}63.7\\ \underline{3.5}\end{array}$ e) $\begin{array}{r}73.4\\ \underline{6.4}\end{array}$ f) $\begin{array}{r}93.7\\ \underline{4.7}\end{array}$

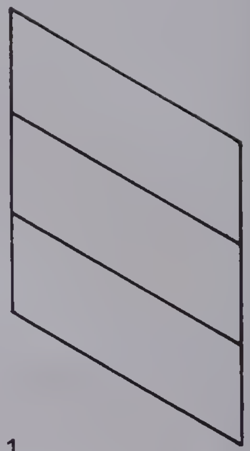
Unit 3, Check 3

1. Trace each picture and use it to illustrate the given fraction.

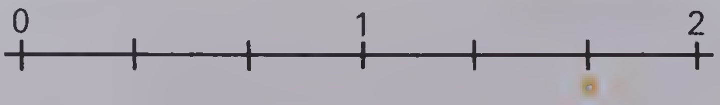
a)

$\frac{3}{8}$

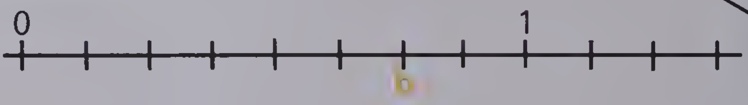
b)

$\frac{2}{3}$

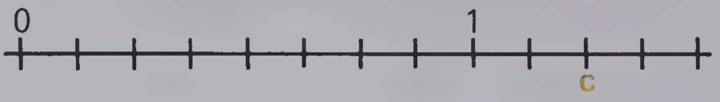
c)

$\frac{7}{8}$

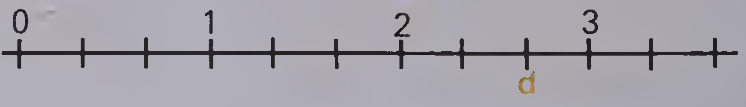
d)

$\frac{3}{3}$

2. Write fractions for the points marked on the number lines.

a)


b)


c)


d)


3. Select from the set the fraction equivalent to the first fraction.

a) $\frac{6}{8}$ $\left(\frac{6}{4}, \frac{3}{4}, \frac{3}{8}\right)$ b) $\frac{8}{8}$ $\left(\frac{10}{10}, \frac{3}{4}, \frac{12}{8}\right)$ c) $\frac{3}{4}$ $\left(\frac{2}{2}, \frac{6}{8}, \frac{4}{10}\right)$ d) $\frac{1}{2}$ $\left(\frac{4}{8}, \frac{3}{5}, \frac{1}{4}\right)$

4. Complete.

a) $\frac{2}{2} = \frac{?}{8}$ b) $\frac{1}{2} = \frac{?}{10}$ c) $\frac{3}{4} = \frac{?}{8}$ d) $\frac{2}{8} = \frac{?}{4}$ e) $\frac{5}{10} = \frac{?}{2}$

f) $\frac{4}{8} = \frac{?}{2}$ g) $\frac{50}{100} = \frac{?}{2}$ h) $\frac{40}{100} = \frac{?}{10}$ i) $\frac{40}{100} = \frac{?}{5}$ j) $\frac{3}{5} = \frac{?}{100}$

5. Divide.

a) $12\overline{)621}$ b) $16\overline{)324}$ c) $18\overline{)774}$ d) $11\overline{)312}$ e) $15\overline{)463}$

6. Round each number to the nearest unit.

a) 4.6 b) 13.3 c) 84.7 d) 39.6 e) 109.8 f) 127.1 g) 439.7

7. Round each number to the nearest tenth.

a) 2.61 b) 4.16 c) 13.91 d) 20.76 e) 0.73 f) 105.76 g) 19.98

8. Divide. Give the quotient to the nearest tenth.

a) $5\overline{)37}$ b) $5\overline{)18}$ c) $9\overline{)37}$ d) $6\overline{)85}$ e) $3\overline{)28}$ f) $8\overline{)45}$

g) $12\overline{)37}$ h) $15\overline{)41}$ i) $18\overline{)62}$ j) $13\overline{)511}$ k) $17\overline{)213}$ l) $12\overline{)352}$

Practice 3

1. Draw a line segment 8 cm long. Show $\frac{4}{8}$.

2. Draw a line segment 8 cm long. Show $\frac{5}{8}$.

3. Draw a line segment 6 cm long. Show $\frac{2}{3}$.

4. Draw a line segment 3 cm long. Show $\frac{1}{3}$.

5. Draw line segments to illustrate

   a) $\frac{4}{3}$ b) $\frac{3}{8}$ c) $\frac{5}{8}$ d) $\frac{9}{3}$ e) $\frac{16}{8}$

6. Complete.

   a) $\frac{2}{5} + \frac{1}{10} = ?$ b) $\frac{1}{2} + \frac{5}{4} = ?$ c) $\frac{1}{2} + \frac{1}{10} = ?$ d) $\frac{7}{8} + \frac{2}{4} = ?$ e) $\frac{3}{4} + \frac{2}{2} = ?$

7. Complete.

   a) $\frac{5}{10} - \frac{1}{5} = ?$ b) $\frac{35}{100} - \frac{2}{10} = ?$ c) $\frac{7}{4} - \frac{1}{2} = ?$ d) $\frac{6}{5} - \frac{4}{10} = ?$ e) $\frac{2}{2} - \frac{47}{100} = ?$

8. Divide.

   a) $11\overline{)347}$ b) $15\overline{)647}$ c) $18\overline{)137}$ d) $13\overline{)476}$ e) $19\overline{)586}$ f) $12\overline{)195}$

9. Round each number to the nearest unit.

   a) 4.4 b) 9.7 c) 18.6 d) 24.1 e) 39.9 f) 141.3 g) 89.9

10. Round each number to the nearest tenth.

    a) 3.42 b) 8.89 c) 13.49 d) 29.81 e) 146.38 f) 236.63 g) 189.67

11. Divide. Give the quotient to the nearest tenth.

    a) $15\overline{)364}$ b) $13\overline{)412}$ c) $11\overline{)138}$ d) $17\overline{)842}$ e) $16\overline{)387}$ f) $19\overline{)197}$

12. Find the total. Round to the nearest tenth.

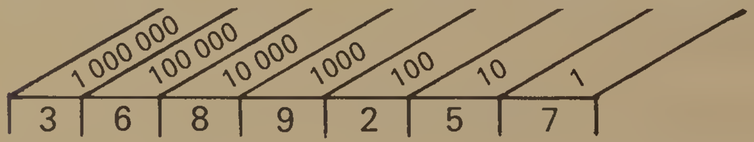
    a) $\begin{array}{r}1.56\\2.47\\\underline{6.59}\end{array}$ b) $\begin{array}{r}3.36\\14.56\\\underline{8.72}\end{array}$ c) $\begin{array}{r}19.59\\6.54\\\underline{3.98}\end{array}$ d) $\begin{array}{r}36.04\\19.80\\\underline{7.82}\end{array}$ e) $\begin{array}{r}142.28\\36.48\\\underline{10.07}\end{array}$ f) $\begin{array}{r}83.46\\139.76\\\underline{347.62}\end{array}$

13. Find the product. Round to the nearest tenth.

    a) $\begin{array}{r}0.9\\\underline{0.4}\end{array}$ b) $\begin{array}{r}1.7\\\underline{0.4}\end{array}$ c) $\begin{array}{r}5.7\\\underline{0.9}\end{array}$ d) $\begin{array}{r}6.7\\\underline{1.4}\end{array}$ e) $\begin{array}{r}8.2\\\underline{3.5}\end{array}$ f) $\begin{array}{r}7.5\\\underline{5.3}\end{array}$

Answers / Unit 3, Check 1

1. a) three million, six hundred and eighty-nine thousand, two hundred, and fifty-seven
b) 3 000 000 + 600 000 + 80 000 + 9000 + 200 + 50 + 7
c)



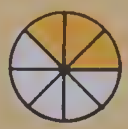
2. a) $4 \times 4 \times 4 = 64$ b) $6 \times 6 \times 6 = 216$ c) $10 \times 10 = 100$
$4 \times 4 \times 4 \times 4 = 256$ $6 \times 6 \times 6 \times 6 = 1296$ $10 \times 10 \times 10 = 1000$
$10 \times 10 \times 10 \times 10 = 10\,000$
3. a) 7^4 b) $2 \times 2 \times 2 \times 2 \times 2 \times 2$ c) 5^4 d) 9^3 e) 10^5 f) 243
4. a) 2083, 5075; 2992 b) \$63.77, \$83.88; \$20.11 c) 2605.4, 3087.9; 482.5
5. a) 80 cm b) 3 dm c) 34 cm d) 4.8 dm e) 1.2 m f) 15 dm g) 0.6 m h) 7 dm
6. a) $\angle FKJ$, $\angle KJG$, $\angle KJF$, $\angle GJF$, $\angle JGF$, $\angle GFK$, $\angle GFJ$, $\angle KFJ$
b) $\angle FKJ$, $\angle KJG$, $\angle JGF$, $\angle GFK$ c) $\angle KFJ$, $\angle GFJ$, $\angle KJF$, $\angle GJF$

Unit 3, Check 2

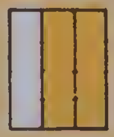
1. a) 12 cm^3 b) 24 cm^3 c) 36 cm^3
2. a) 24 cm^3 b) 32 cm^3 c) 54 cm^3
3. a) 432 b) 966 c) 405 d) 1456 e) 3192 f) 5184 g) 3555
h) 1836 i) 1584 j) 6643 k) 3445 l) 6300
4. a) 58.5 b) 266.4 c) 194.7 d) 418.2 e) 744.8 f) 185.6 g) 102.9
h) 381.8 i) 147.2 j) 381.3 k) 295.8 l) 417.6
5. a) 437.4 b) 938.4 c) 4487.4 d) 2872.8 e) 3958.9 f) 533.4 g) 1304.1
h) 2085.6 i) 5411.7 j) 3432.0
6. a) 81.84 b) 243.78 c) 123.88 d) 133.28 e) 622.34 f) 237.60

Unit 3, Check 3

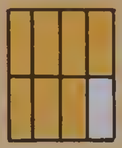
1. Answers may vary.
a)



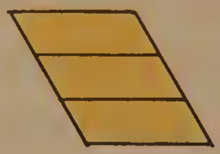
b)



c)



d)



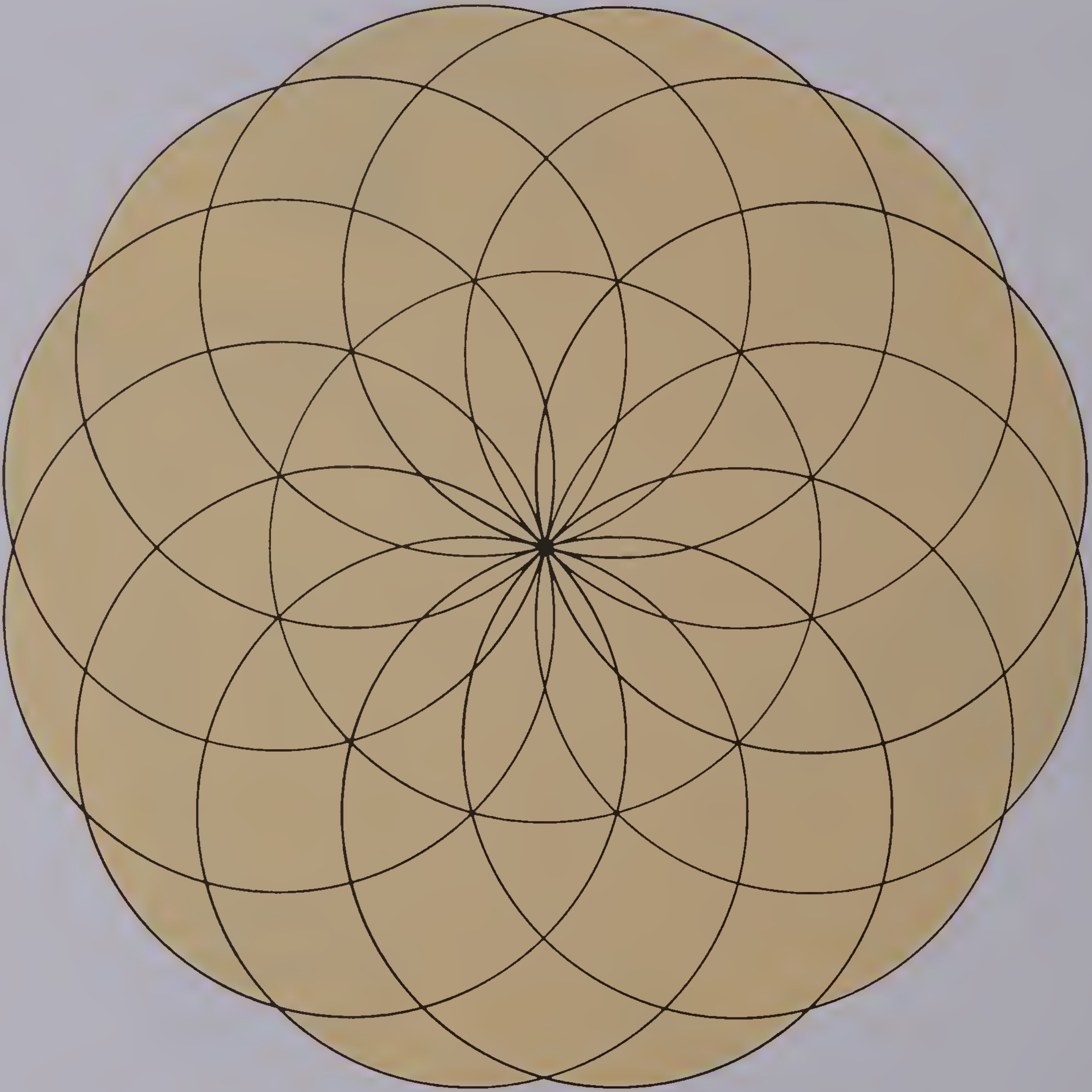
2. a) $a = \frac{5}{3}$ b) $b = \frac{6}{8}$ c) $c = \frac{10}{8}$ d) $d = \frac{8}{3}$ 3. a) $\frac{3}{4}$ b) $\frac{10}{10}$ c) $\frac{6}{8}$ d) $\frac{4}{8}$
4. a) $\frac{8}{8}$ b) $\frac{5}{10}$ c) $\frac{6}{8}$ d) $\frac{1}{4}$ e) $\frac{1}{2}$ f) $\frac{1}{2}$ g) $\frac{1}{2}$ h) $\frac{4}{10}$ i) $\frac{2}{5}$ j) $\frac{60}{100}$
5. a) 51R9 b) 20R4 c) 43 d) 28R4 e) 30R13
6. a) 5 b) 13 c) 85 d) 40 e) 110 f) 127 g) 440
7. a) 2.6 b) 4.2 c) 13.9 d) 20.8 e) 0.7 f) 105.8 g) 20.0
8. a) 7.4 b) 3.6 c) 4.1 d) 14.2 e) 9.3 f) 5.6
g) 3.1 h) 2.7 i) 3.4 j) 39.3 k) 12.5 l) 29.3

Ian Leventhal

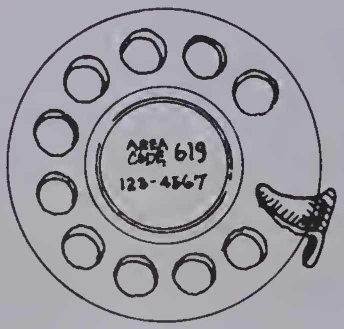
EXPLORE

CIRCLES

What do you see in this picture?
Try to create an interesting design using a different geometric figure.



You can see circular shapes everywhere.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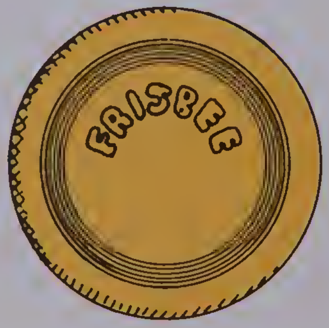
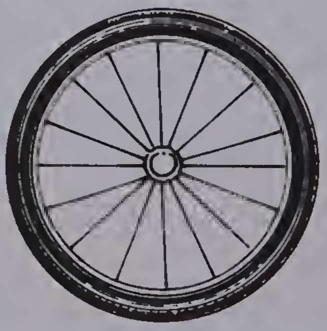
123-4567

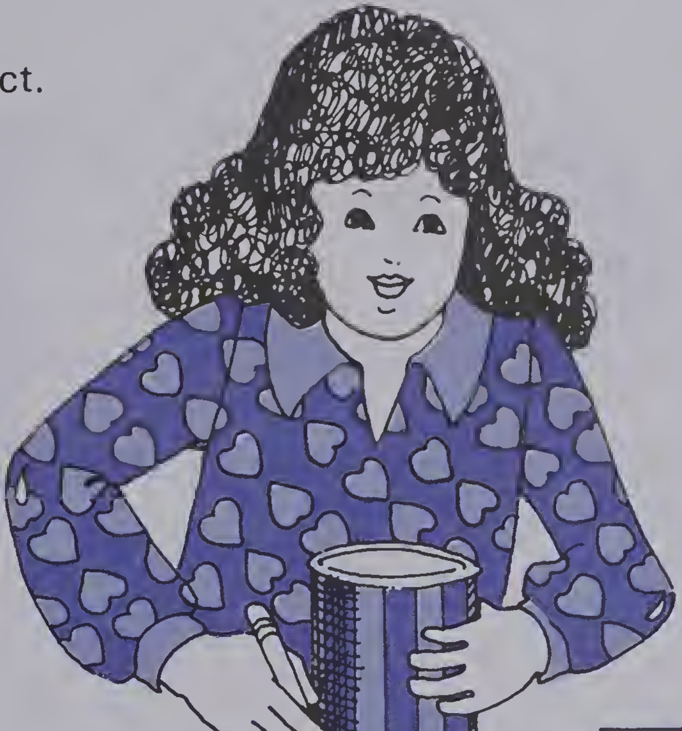


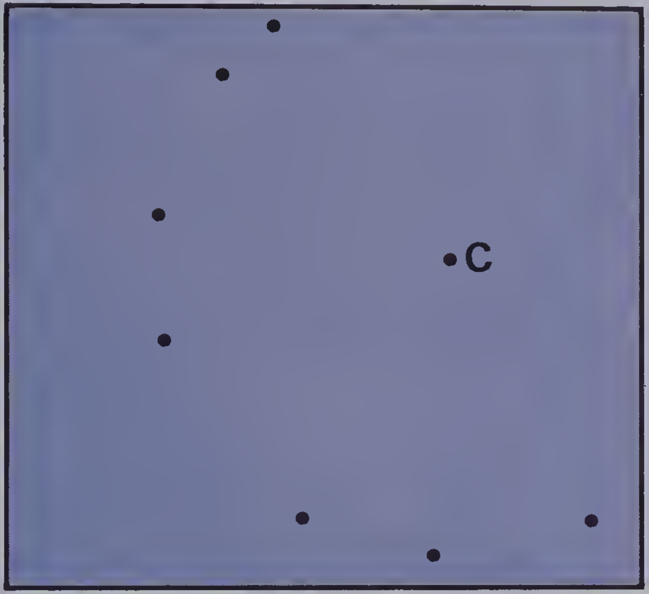


Drawing Circles

How can you draw a circle?
Try these methods.

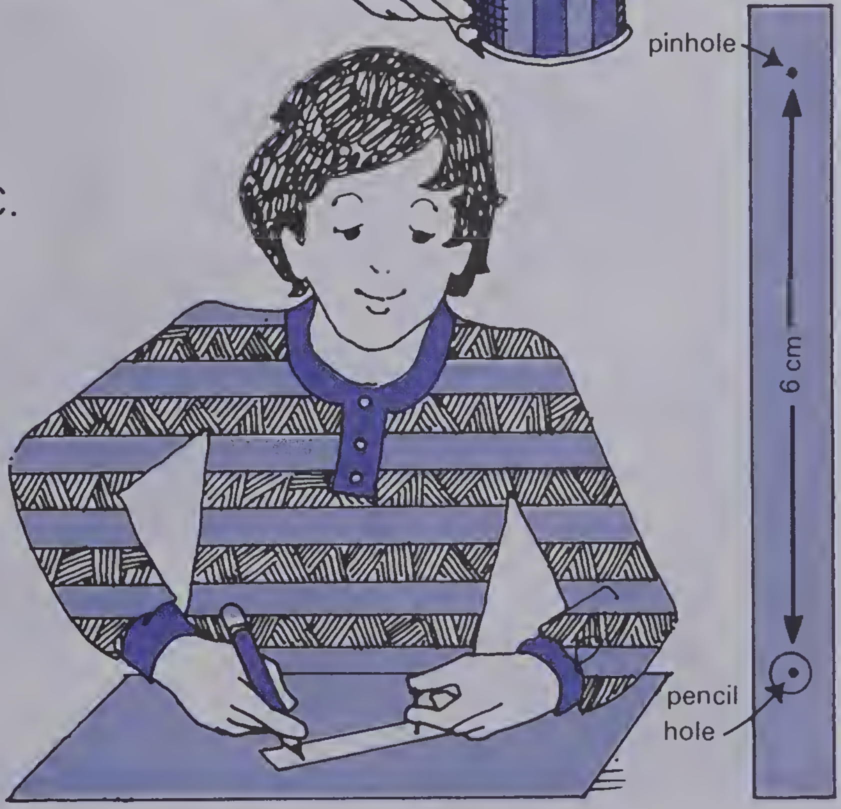
Trace around an object.



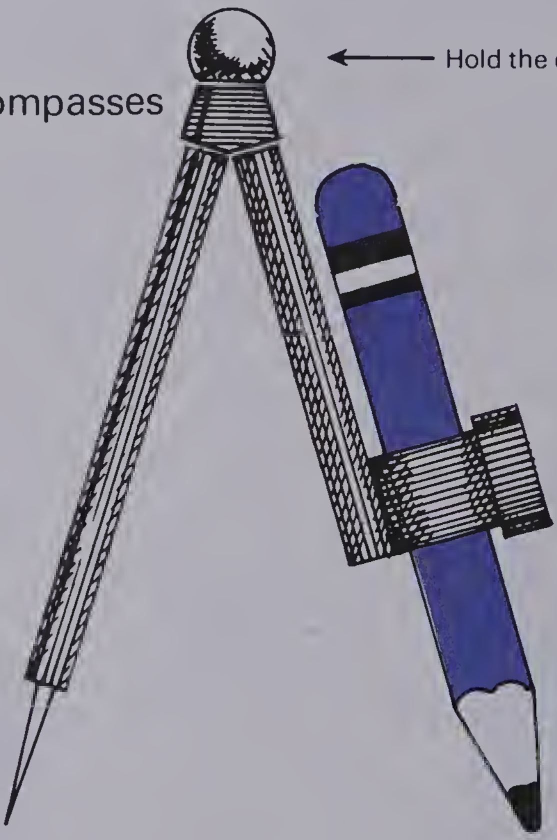


Mark a point C on a piece of paper.
Use your ruler to mark 20 points, each 3 cm from C.
Scatter the points all around C.
Draw a smooth curve through the points.
What have you created?

Make a cardboard strip like the one at the side of this page. Put a pin through the pinhole to fasten the strip to your paper. Draw a circle by putting your pencil in the pencil hole and turning the strip of cardboard about the pin.



Usually we use a pair of **compasses** to draw circles.



Hold the compasses by this knob.

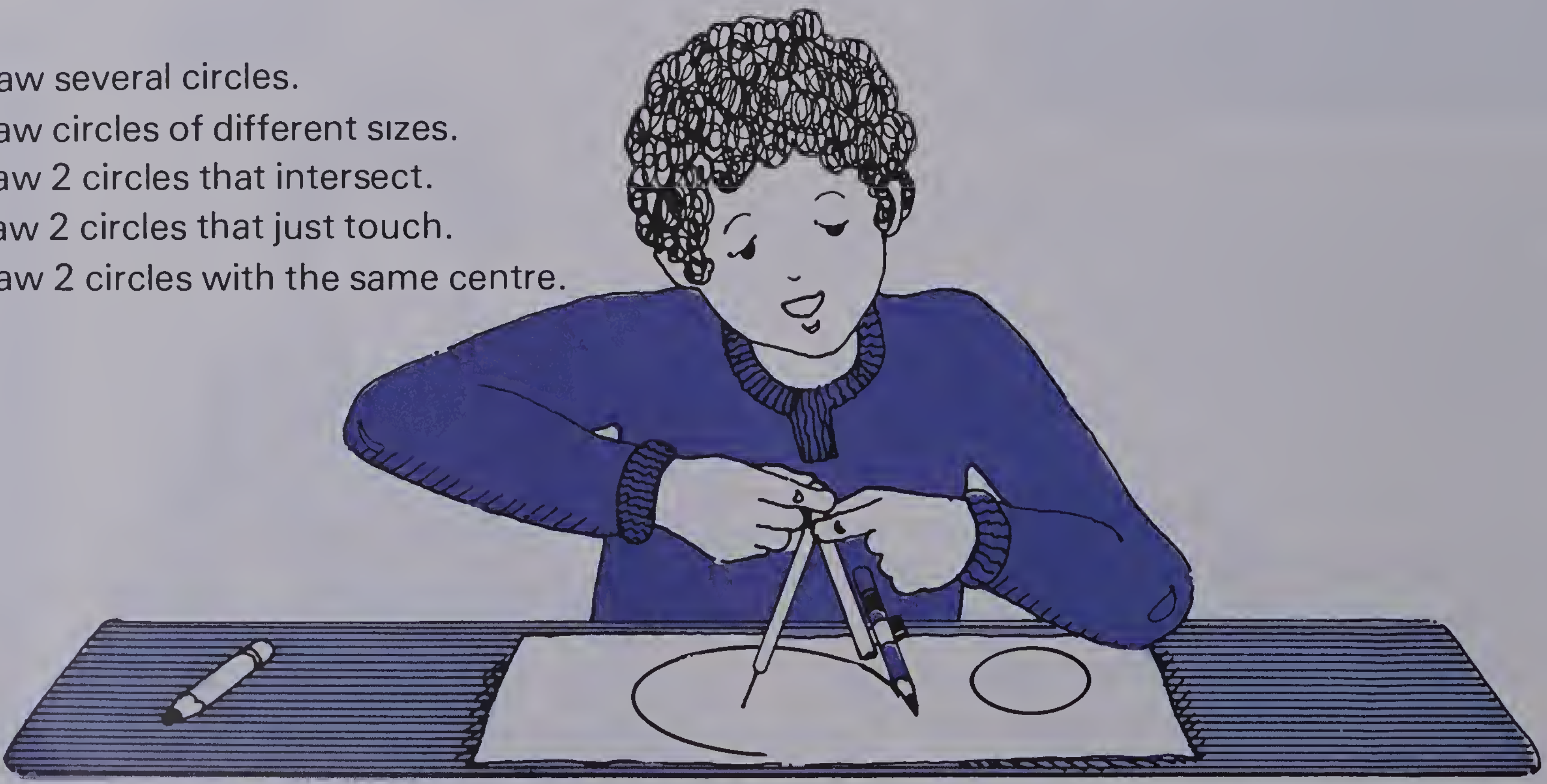
Check to see that the point of the compasses
is even with the point of the pencil.

Use your pair of compasses to
draw a circle.
Make sure that the point of the
compasses is anchored firmly.

It would be helpful to have a piece
of cardboard
under the page of your workbook.

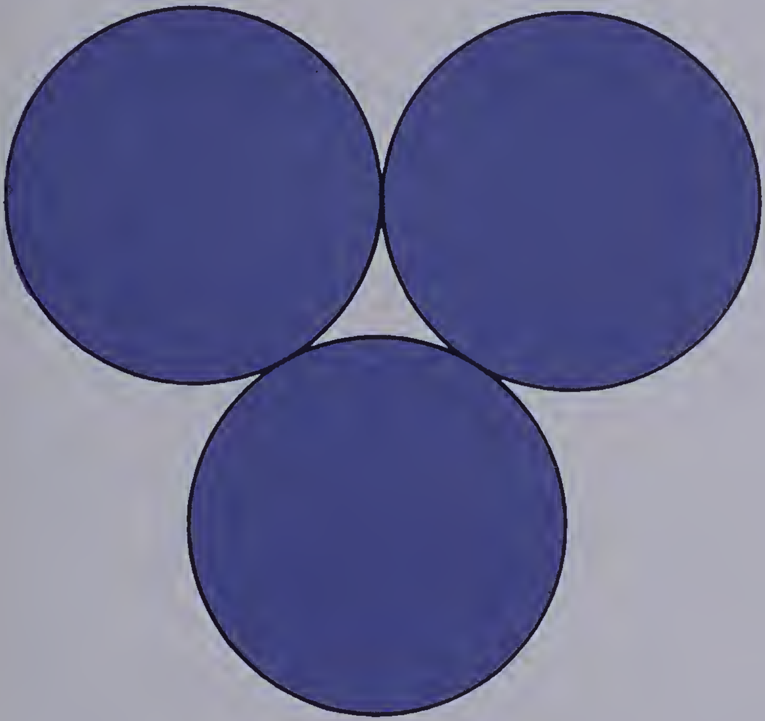
The pencil should be shorter
than the compasses.

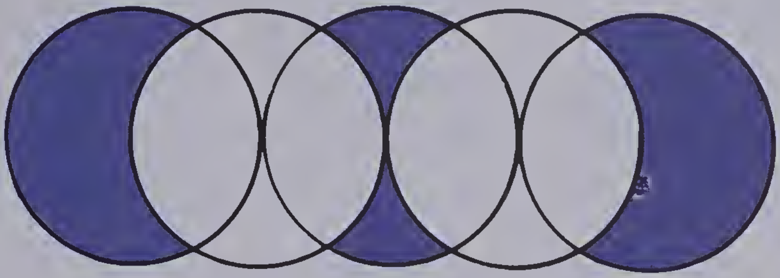
Draw several circles.
Draw circles of different sizes.
Draw 2 circles that intersect.
Draw 2 circles that just touch.
Draw 2 circles with the same centre.

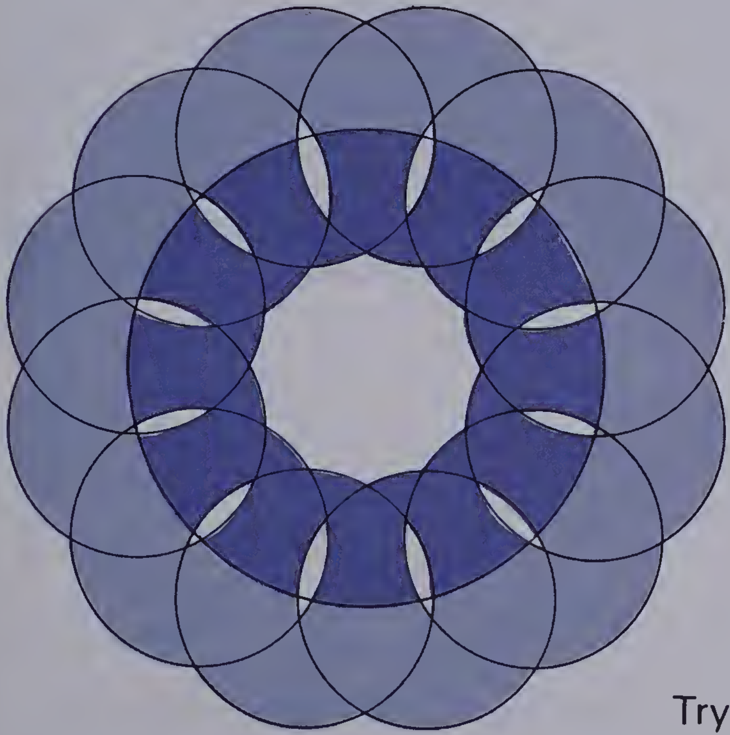


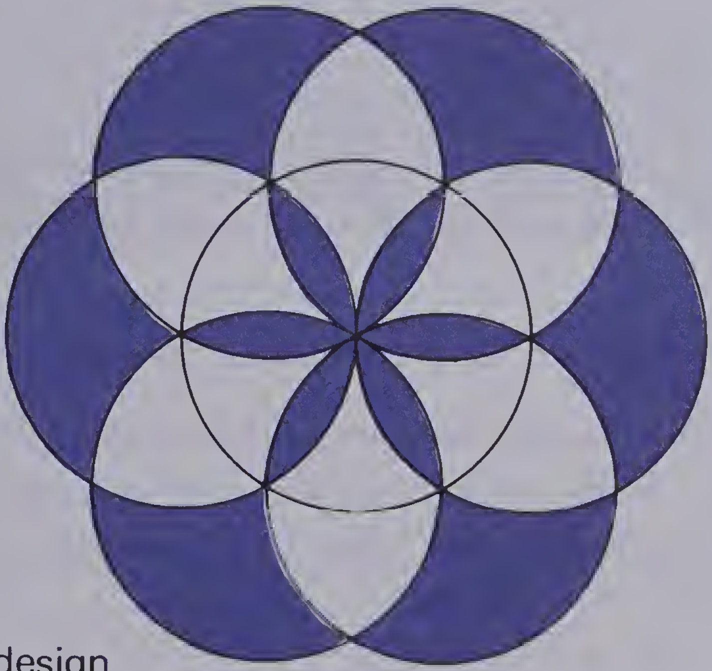
Designs with Circles

Use your compasses to create these designs.





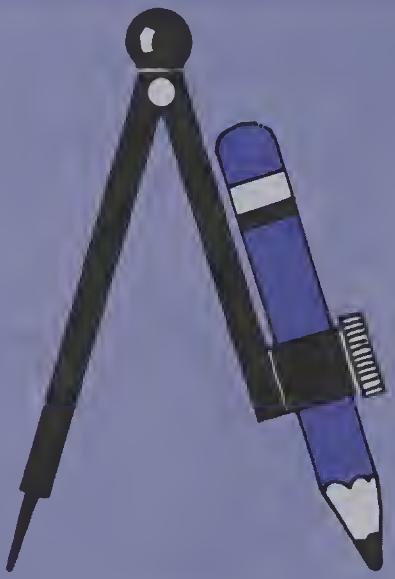




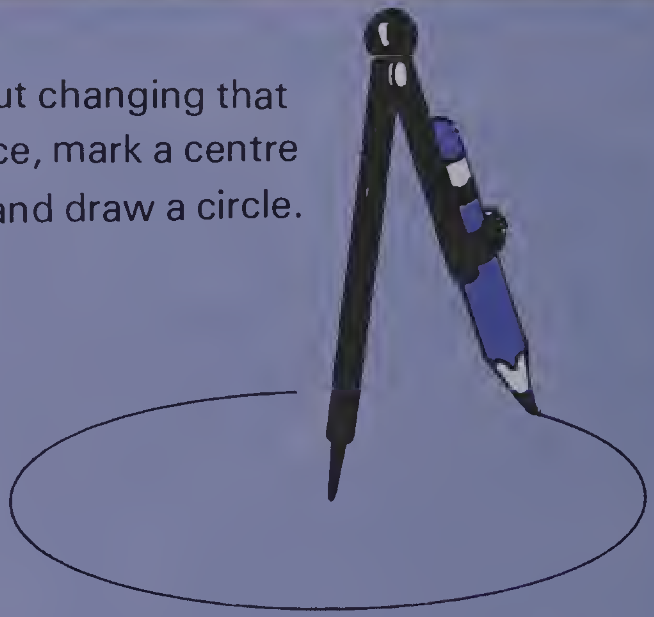
Try to create the design
made with circles on page 252.

Radius/Diameter

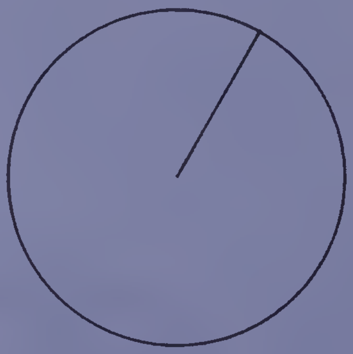
Spread the arms of the compasses so that the distance between the pencil point and the point of the compasses is 5 cm.



Without changing that distance, mark a centre point and draw a circle.

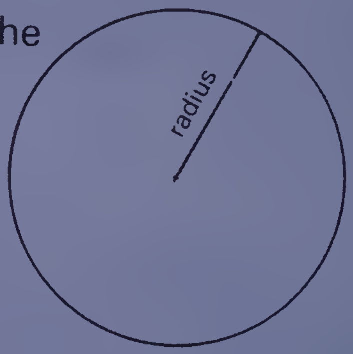


Join the centre of the circle to any point on the circle.



This is the **radius** of your circle.

What is the length of the radius of your circle?

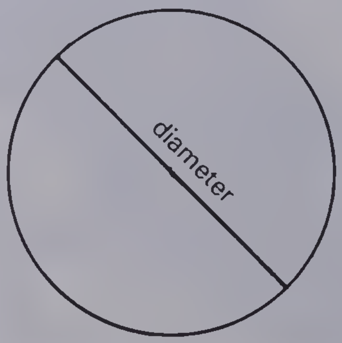


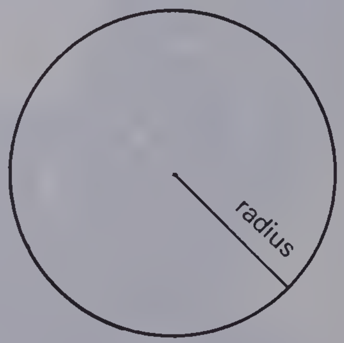
Measure to check.

How would you construct a circle with a radius of 7 cm?

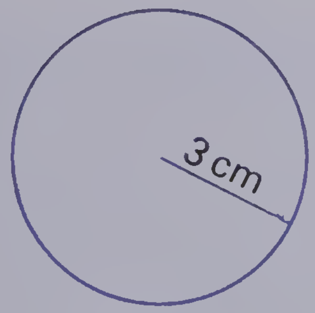
Mark a point and draw a circle with a radius of 6 cm.

Draw a straight line through the centre of the circle from one point on the circle to another point on the circle. This is the **diameter** of the circle.





How do you think the length of the diameter compares with the length of the radius?
Measure to check.
Draw a circle with a radius of 3 cm.
How long do you think the diameter will be?
Check.

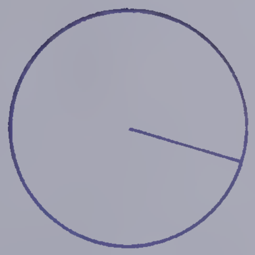


How would you draw a circle with a diameter of 10 cm?

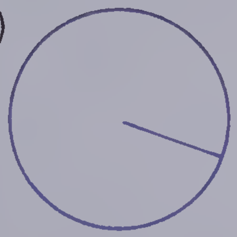
IN ACTION

1. Measure, in millimetres, the radius of each of these circles.

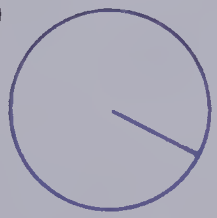
a)



b)

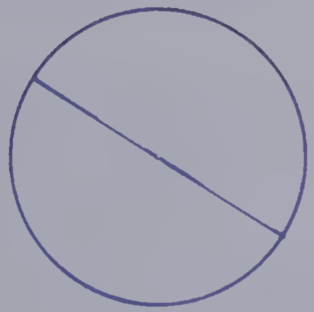


c)

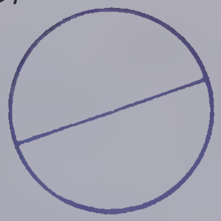


2. Measure, in millimetres, the diameter of each circle.

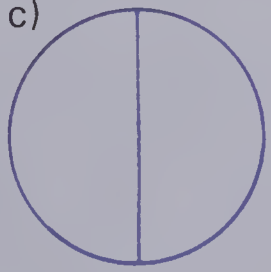
a)



b)



c)



3. Draw circles with these radii.

a) 9 cm	b) 3.5 cm	c) 18 mm	d) 4.2 cm	e) 38 mm

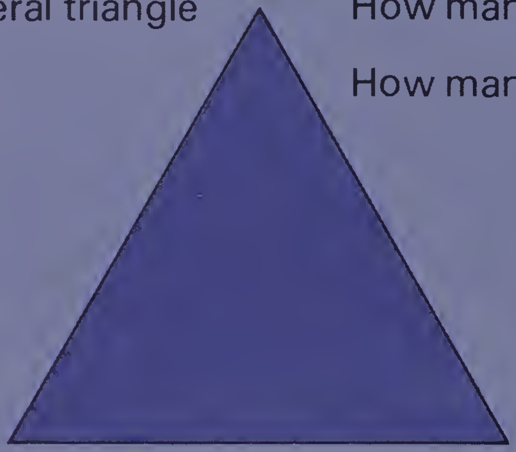
4. Draw circles with these diameters.

a) 10 cm	b) 4.2 cm	c) 20 mm	d) 8 cm	e) 36 mm

EXPLORE

TRIANGLES

Equilateral triangle



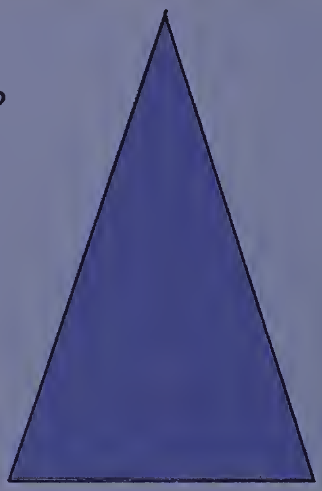
How many congruent sides does an equilateral triangle have?

How many congruent angles does an equilateral triangle have?

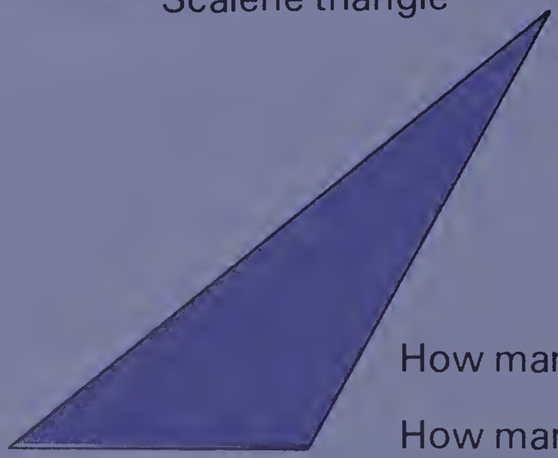
How many congruent sides does an isosceles triangle have?

How many congruent angles does an isosceles triangle have?

Isosceles triangle

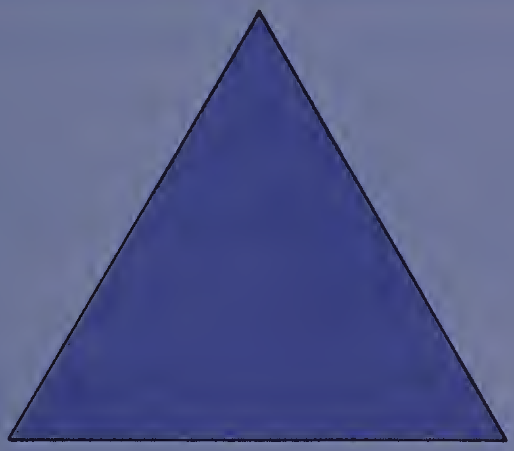


Scalene triangle



How many congruent sides does a scalene triangle have?

How many congruent angles does a scalene triangle have?



Equilateral triangle

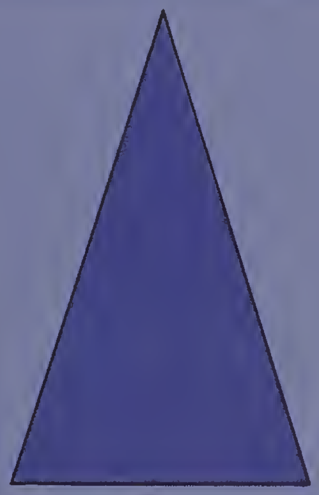
3 congruent sides
3 congruent angles

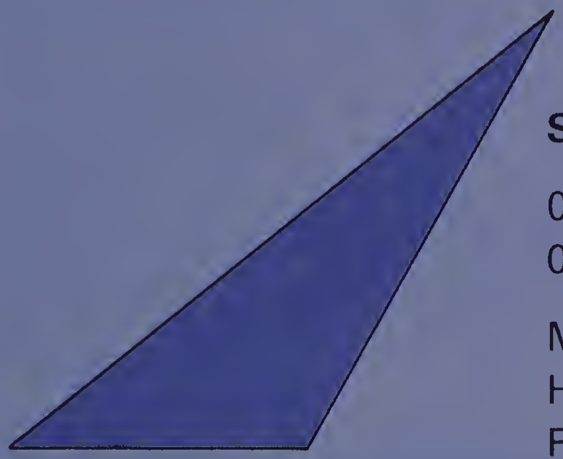
Make a model of an equilateral triangle.
Fold it to discover the number of lines of symmetry.

Isosceles triangle

2 congruent sides
2 congruent angles

Make a model of an isosceles triangle.
Fold it to discover the number of lines of symmetry.





Scalene triangle

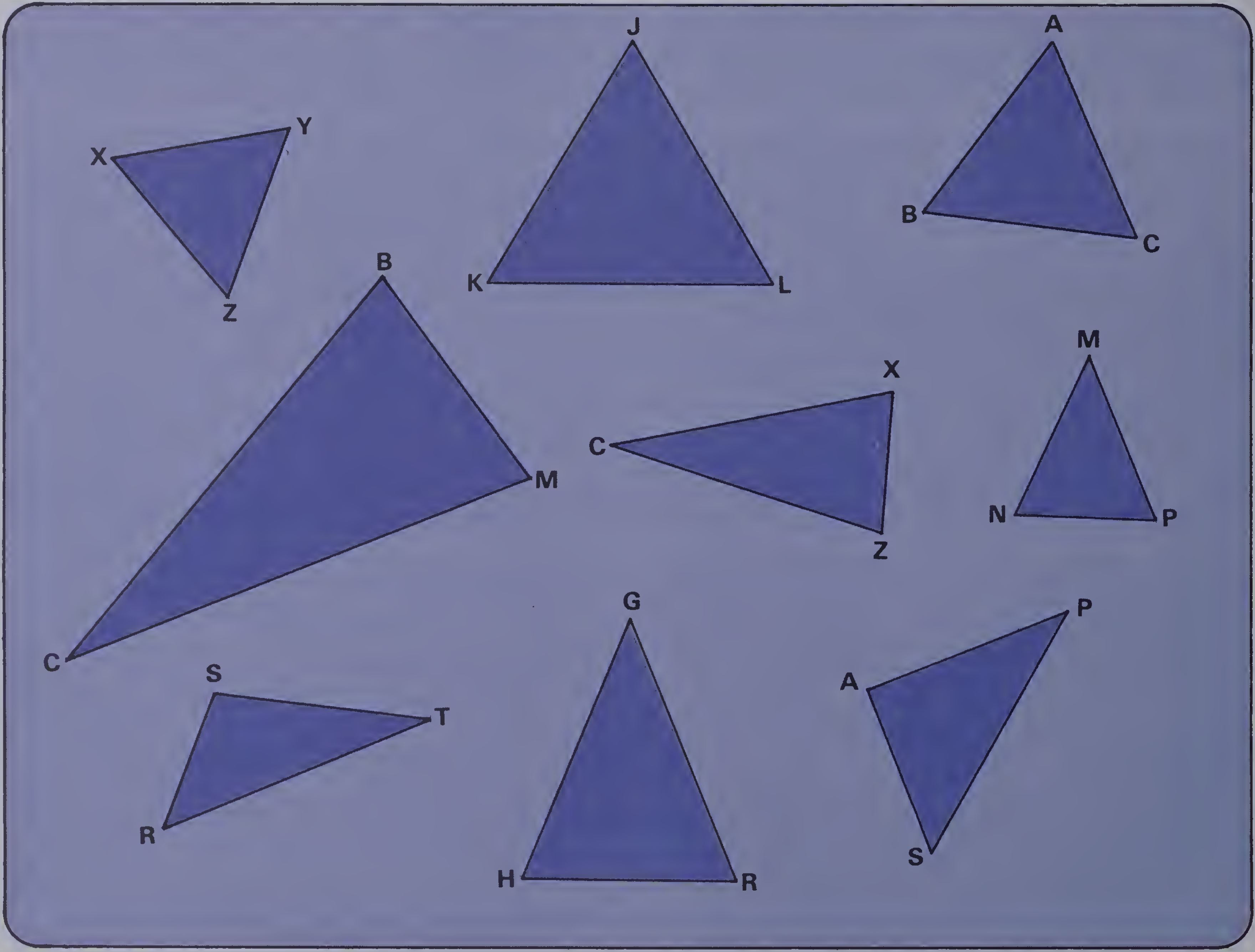
0 congruent sides
0 congruent angles

Make a model of a scalene triangle.
How many lines of symmetry do you think you will find?
Fold it to discover the number of lines of symmetry.

IN ACTION

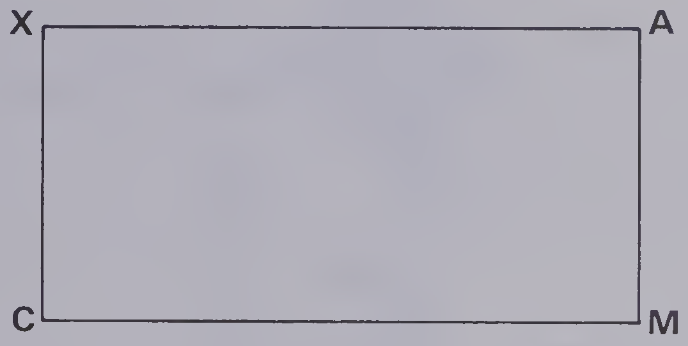
1. Copy this chart. Use it to sort the triangles.

Equilateral	Isosceles	Scalene
△ABC		


J
A
Y
X
B
C
B
K
L
Z
X
M
C
M
N
P
Z
G
P
C
S
T
A
R
H
R
S

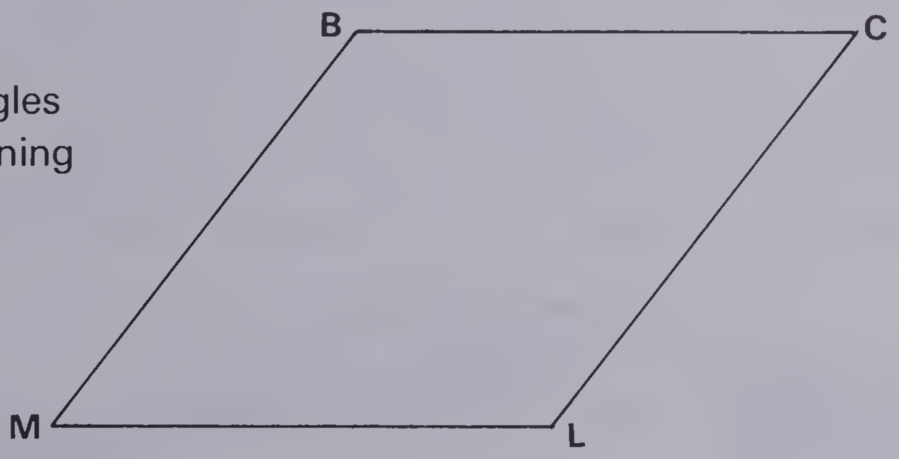
2. Draw a rectangle XAMC.
   Join points X and M.
   What kinds of triangles have you created?

   Join points A and C.
   What kinds of triangles have you created now?



3. Draw 2 other rectangles.
   Do you always create the same kinds of triangles when you join opposite vertices?

4. Draw a rhombus.
   What kinds of triangles do you create by joining
   a) points B and L?
   b) points C and M?



5. Investigate the kinds of triangles you can create by drawing a square and joining opposite vertices.

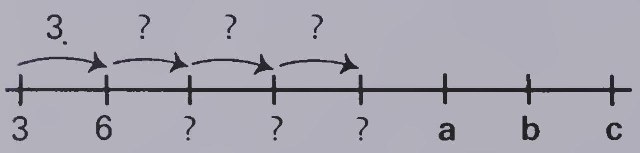
6. Investigate the kinds of triangles you can create by drawing a parallelogram and joining opposite vertices.

Triangular Numbers

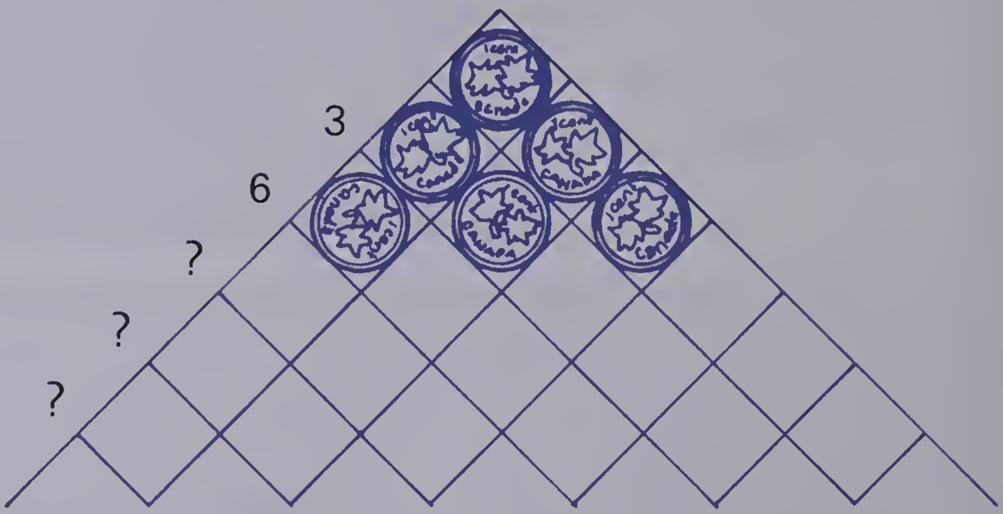
The smallest triangular number is 3.
What is the next larger triangular number?
Continue the pattern to find
the next 3 triangular numbers.

3, 6, ?, ?, ?

The difference between the first
and second triangular numbers is 3.
Find the difference between
each pair of triangular numbers.



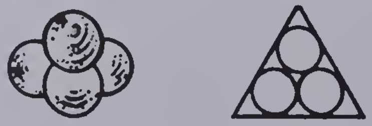
Find the triangular numbers for a, b and c.



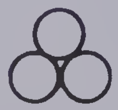
Use pennies or markers
to build some triangular numbers.

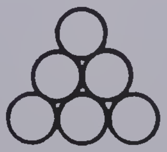
Triangular Pyramids

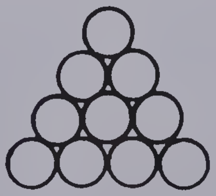
Perhaps you have visited a fort and seen
cannon balls piled this way.



1. How many cannon balls are in each triangular pyramid?

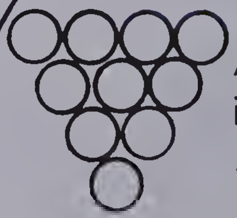
a) 

b) 

c) 

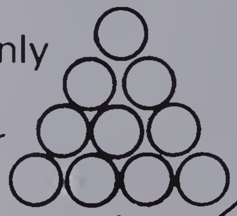
2. Write the number pattern for the first
5 triangular pyramid numbers.
3. A grocer stacks his canned goods in a triangular pyramid.
   - a) How many rows can he make with a case of 12 cans?
   - b) How many rows can he make with a case of 24 cans?
   - c) How many rows can he make with a case of 36 cans?
   - d) How many cans would he need to make a triangular pyramid 7 cans high?

TRIANGULAR PUZZLE



Arrange 10 coins
in a triangle,
as shown.

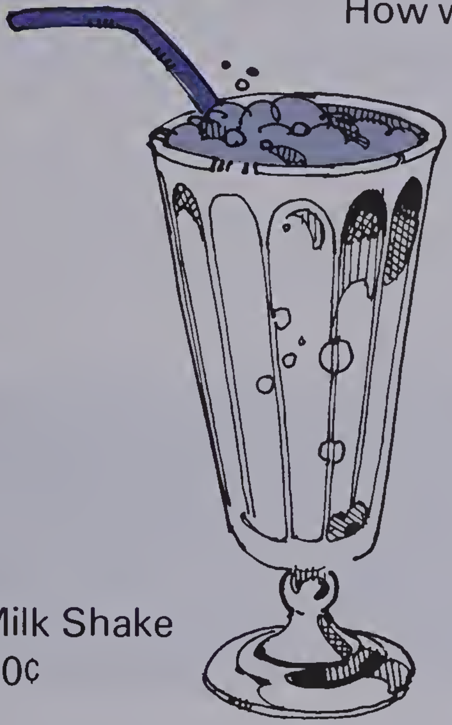
By moving only
3 coins,
make your
triangle
look like this.



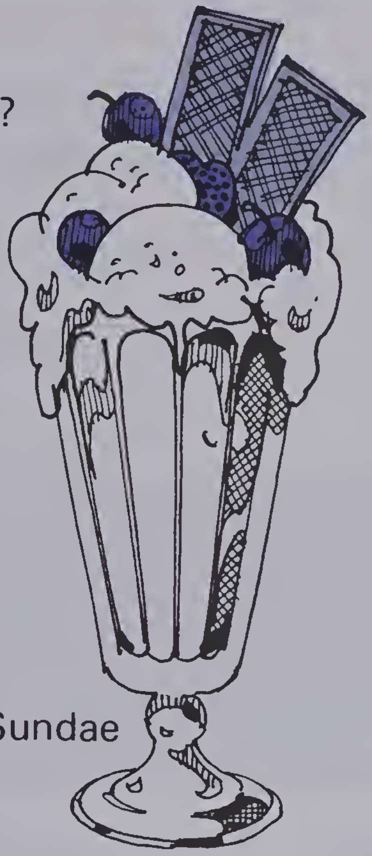
EXPLORE

RATIO/Making Comparisons

How would you compare the 2 prices?

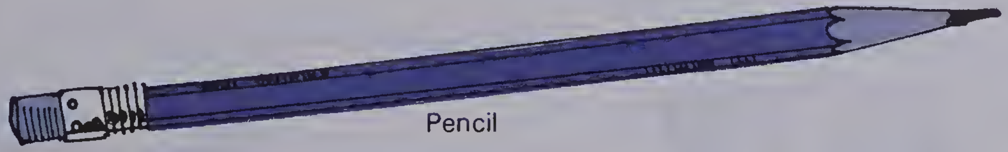


Giant Milk Shake
50¢

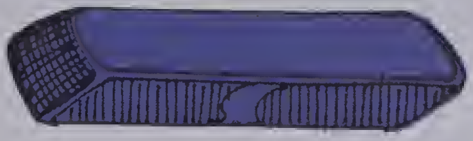


De Luxe Vanilla Sundae
$1.00

How would you compare the 2 lengths?

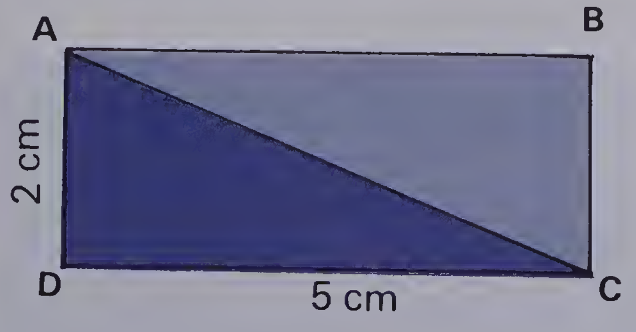


Pencil
15 cm



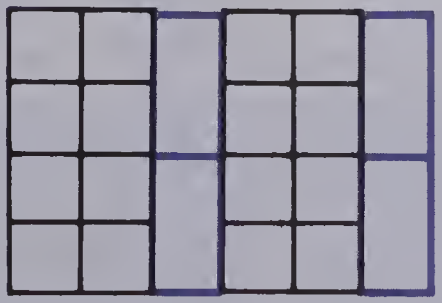
eraser
5 cm

How would you compare the 2 areas?



Area of triangle ACD
Area of rectangle ABCD

How would you compare the number of squares and the number of rectangles in the pattern?



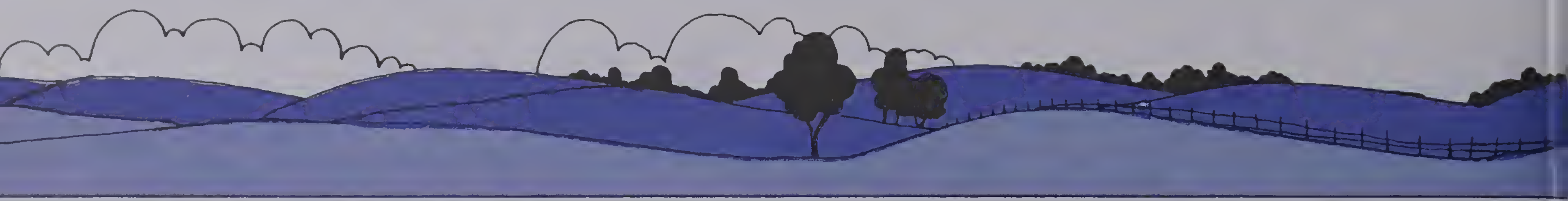
For every 8 squares, there are 2 rectangles.

We say the **ratio** of squares to rectangles is 8 to 2.

This is written 8:2 (ratio)

or $\frac{8}{2}$ (fraction)

What is the ratio of squares to rectangles?



Ratio

Comparisons are often made by using ratios.
In a schedule of 30 hockey games, the Blue Streaks won 20 games, lost 6, and tied 4.

The ratio of games won to games lost is 20:6 or $\frac{20}{6}$.

The ratio of games won to games tied is 20:4 or $\frac{20}{4}$.

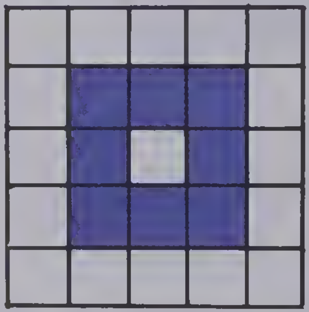
The ratio of games lost to games tied is 6:4 or $\frac{6}{4}$.

Team	Games Won	Games Lost	Games Tied	Games Played	Ratio Games Won to Games Played	Ratio Games Won to Games Lost	Ratio Games Won to Games Tied
Blue Streaks	20	6	4	30	?	20:6 or $\frac{20}{6}$	20:4 or $\frac{20}{4}$

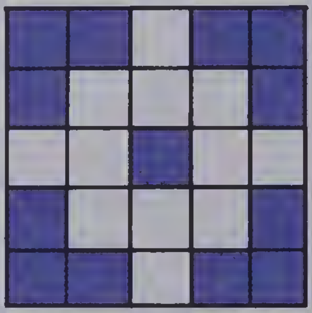
IN ACTION

1. Look at each pattern.
What is the ratio of the number of coloured tiles to the number of white tiles?

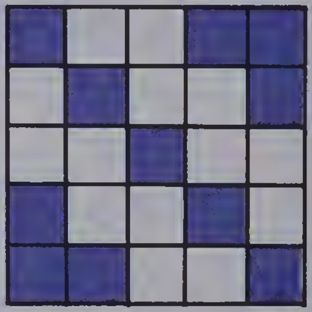
a)



b)

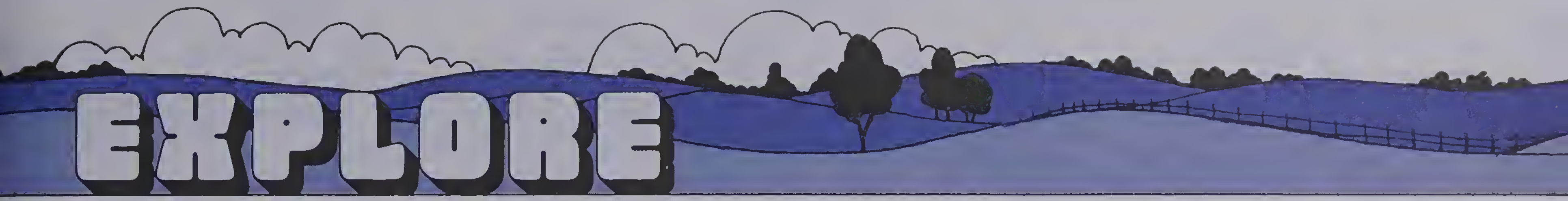


c)



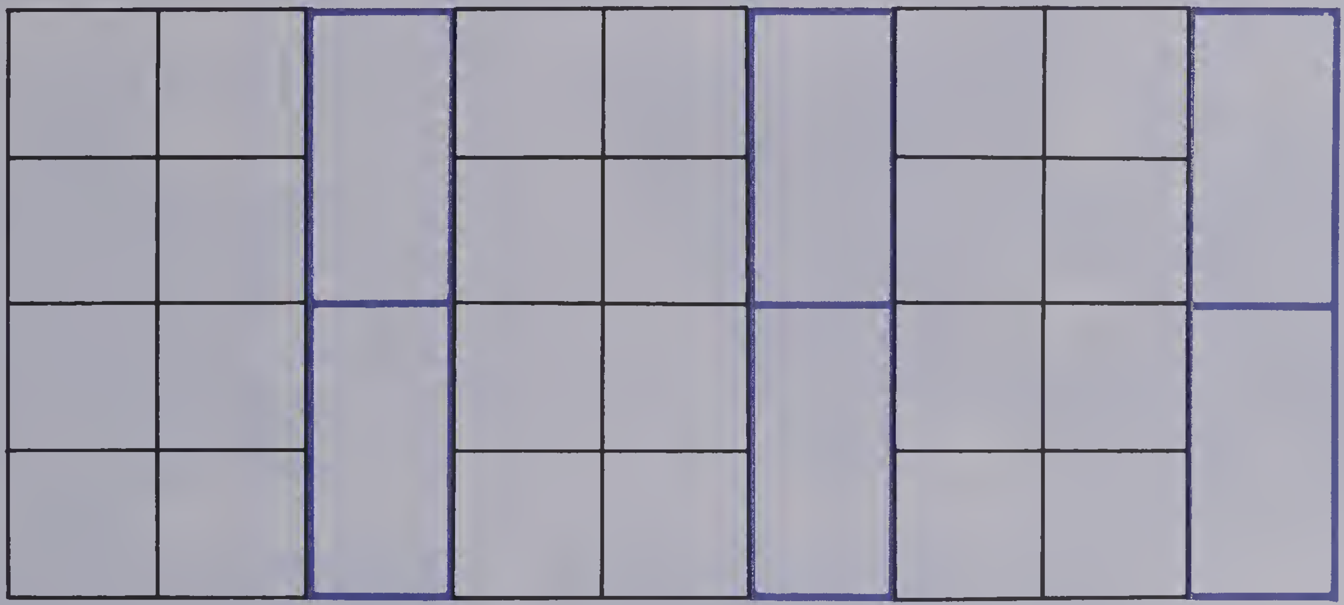
2. Complete the chart for the football schedule.

Team	Games Won	Games Lost	Games Tied	Games Played	Ratio Games Won to Games Played	Ratio Games Won to Games Lost	Ratio Games Won to Games Tied
Tigers	12	2	1				
Rams	11	4	1				
Lions	10	3	2				
Riders	8	6	1				



PER CENT/Meaning of Per Cent

Think about the pattern of squares and rectangles again.



For every 8 squares, there are 2 rectangles.
The ratio is 8:2.

Suppose there are 100 figures in the pattern.
How many are squares?
80

How many are rectangles?
20

80 out of 100 or $\frac{80}{100}$ or 80% (80 per cent) are squares.

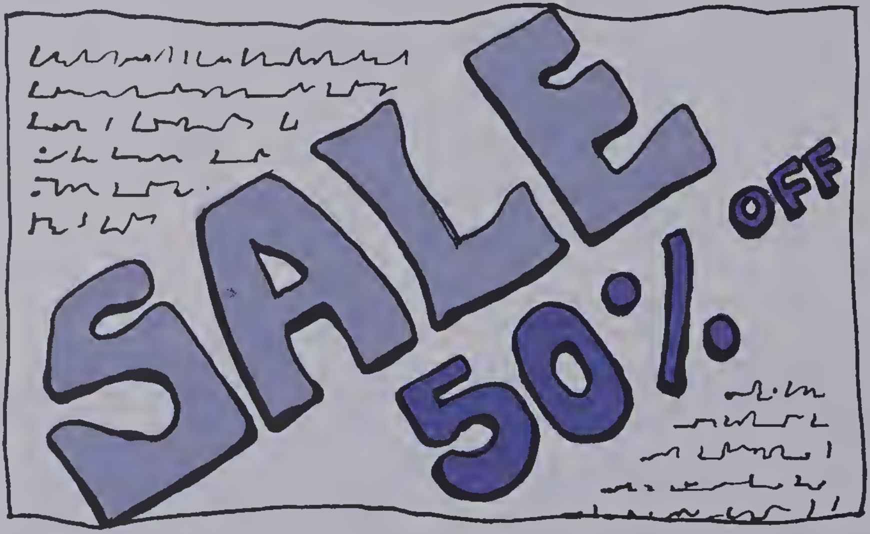
20 out of 100 or $\frac{20}{100}$ or 20% (20 per cent) are rectangles.

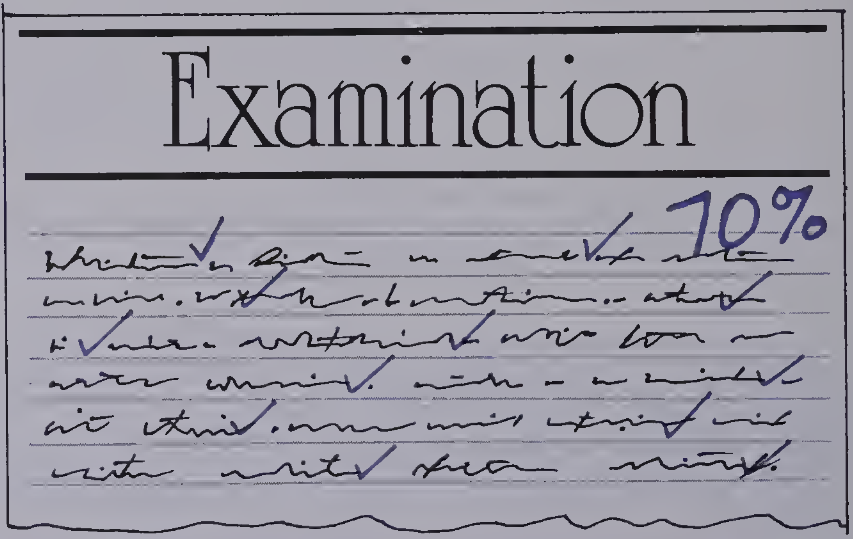
A comparison of a number to 100 is called a **per cent.**

The symbol % means per cent.
You scored 70 marks out of 100 on a test.
What per cent did you score?

Per Cent

Using a per cent is a very common way of making a comparison.





60% of the people voted.

$$60:100 = \frac{60}{100}$$

$$= 60\%$$

(read as "60 per cent")

The price went up 9.5%.

$$9.5:100 = \frac{9.5}{100}$$

$$= 9.5\%$$

IN ACTION

1. Write as per cents.

a) 50:100 b) $\frac{25}{100}$ c) 7:100 d) 75:100 e) $\frac{90}{100}$

f) $\frac{3}{100}$ g) 2:100 h) $\frac{10.5}{100}$ i) $\frac{8.25}{100}$ j) 12.5:100

2. Write as fractions.

a) 60% b) 10% c) 2.5% d) 50% e) 12.5%

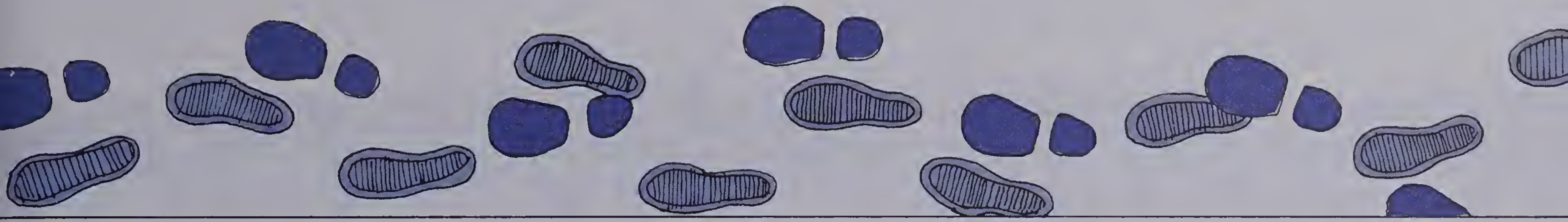
f) 20% g) 7.5% h) 75% i) 9.25% j) 25%

3. 100 electric light bulbs were tested. 2 were faulty. What per cent were faulty?

4. Paul obtained 70 marks out of 100 on a swimming test. What per cent did he get on the test?

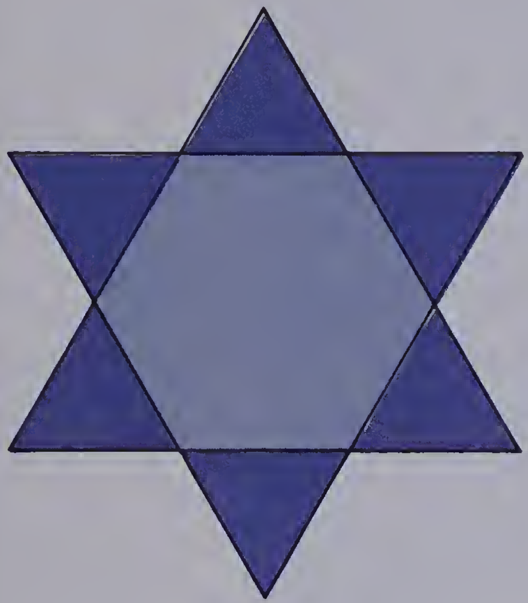
5. Out of every $100 the Martins earn, they pay $30 in rent. What per cent of their income is paid in rent?

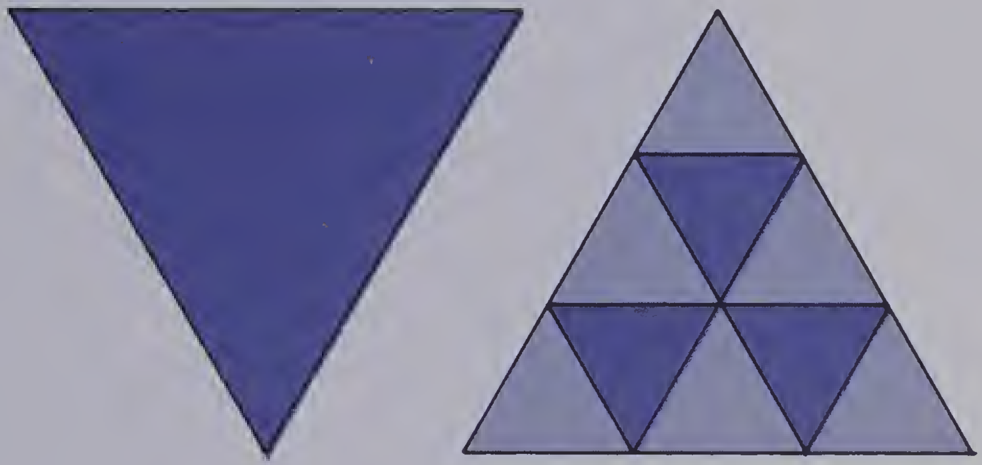
6. Out of 100 children in the yard, 55 were girls. What per cent were girls? What per cent were boys?



Retrace Your Steps

1. What is the ratio of:
   a) triangles to hexagon?
   b) large triangle to small triangles?





2. There are 4 swings and 12 children. What is the ratio of swings to children?

3. There are 24 apples and 12 boys. What is the ratio of apples to boys?

4. There are 16 sandwiches and 8 girls. What is the ratio of sandwiches to girls?

5. There are 10 tires and 2 cars. What is the ratio of tires to cars?

6. 100 ribbons were given at the Science Fair: 15 Firsts, 20 Seconds, 30 Thirds, and 35 Honourable Mentions. Complete.

Award	Number of Awards	Fraction of Total Number	Per Cent of Total Number
First			
Second			
Third			
Honourable Mention			

7. Express each as a per cent.
   a) 80:100 b) $\frac{35}{100}$ c) 45:100 d) $\frac{99}{100}$ e) 8:100 f) $\frac{16}{100}$

8. Write the fraction for each percent.
   a) 64% b) 18% c) 10.5% d) 85% e) 5% f) 8.5%

9. Write the ratio for each per cent.
   a) 87% b) 10% c) 67.5% d) 7.25% e) 8% f) 15%

LETTER SYMBOLS/Representing Numbers

Letter symbols are used to represent numbers.
If these are the numbers for n,
$n = \{0,1,3,5,7\}$,
n is the set of 0,1,3,5,7

We can find the numbers for $n + 3$

$$\begin{array}{c} n + 3 \\ 0 + 3 = 3 \\ 1 + 3 = 4 \\ 3 + 3 = 6 \\ 5 + 3 = 8 \\ 7 + 3 = 10 \\ n + 3 = \{3,4,6,8,10\} \end{array}$$

Complete to show the numbers for $n + 5$, $n \times 3$, $n \times n$.

n	$n + 5$	$n \times 3$	$n \times n$
0	$0 + 5 =$?	$0 \times 3 = 0$	$0 \times 0 = 0$
1	?	$1 \times 3 =$?	$1 \times 1 =$?
3			
5			
7			

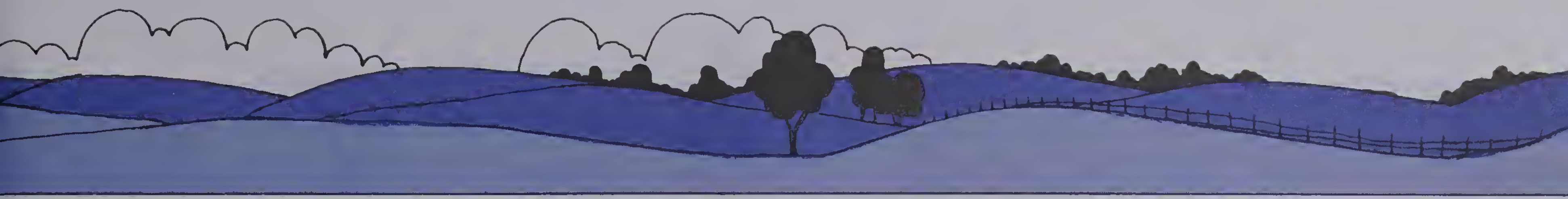
IN ACTION

For $n = \{0,1,3,5,7\}$, $n + 5 = \{5,6,8,10,12\}$,
$n \times 3 = \{0,3,9,15,21\}$, $n \times n = \{0,1,9,25,49\}$

1. If these are the numbers for k, $k = \{3,6,9,12,15\}$,
find a) $k - 3$ b) $k \div 3$ c) $k \times k$ d) $k + 10$ e) $k \times 10$

2. If y represents the first 3 even numbers,
write the set for y. (0 is the first even number.)
Write the set for
a) $y + 5$ b) $y \times 6$ c) $y \times y$ d) $y \times 100$

3. If m represents the first 4 multiples of 4, other than 0, find
a) $m - 3$ b) $m + 4$ c) $m \times m$ d) $m \times 4$



Generating Expressions Using Letter Symbols

If the number is **7**		If the number is n
$7 + 5$	Show 5 more than the number	$n + 5$
$7 - 5$	Show 5 less than the number	$n - 5$
7×10	Show 10 times the number	$n \times 10$
$7 \div 10$	Show the number divided by 10	$n \div 10$
7×7	Show the number times itself	$n \times n$

IN ACTION

1. If m is a number, show
   - a) 8 more than the number
   - b) 6 less than the number
   - c) 20 more than the number
   - d) 20 less than the number
   - e) 5 times the number
   - f) the number divided by 5
   - g) the number times itself
   - h) the number doubled

2. If k is a number, what is the meaning of
   - a) $k + 2$
   - b) $k - 2$
   - c) $k \times 9$
   - d) $k \div 9$
   - e) $k \times k$?

3. If $y = 10$, find
   - a) $y + 8$
   - b) $y - 6$
   - c) $y + 20$
   - d) $y - 10$
   - e) $y \times 5$
   - f) $y \div 5$
   - g) $y \times 100$
   - h) $y \times y$
   - i) $y \times y \times 2$
   - j) $y \times y \times 10$

4. If $a = \{0,2,4,6\}$,
   find a) $a + 1$ b) $a \times 2$ c) $a \times a$ d) $a \times 3$ e) $a \times 4$

5. If $p = \{4,8,12\}$,
   find a) $p + 6$ b) $p - 3$ c) $p \times 3$ d) $p \times p$ e) $p \times 5$

6. If $k = \{1,10,100,1000\}$,
   find a) $k + 10$ b) $k \times 10$ c) $k \times 100$ d) $k - k$ e) $k \div k$

7. If n represents a number, show
   a) 1 more than the number b) 1 less than the number
   c) 2 more than the number d) 2 less than the number
   e) n more than the number f) n less than the number
   g) 5 times the number h) the number divided by 5
   i) n times the number j) the number divided by n

8. a)

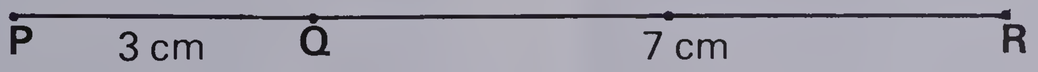
AB is n cm long.

CD is 3 cm longer than AB.
What is the length of CD?

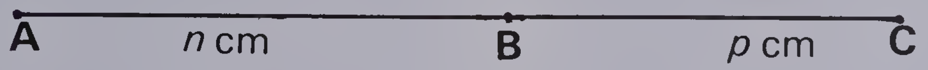
   b) EF is 3 times as long as AB. What is the length of EF?
   c) GH is 3 cm shorter than AB. What is the length of GH?

9. The area of rectangle ABCD is k cm^2.
   What is the area of rectangle
   a) PQRS, which has 2 times the area of ABCD?
   b) LMNP, which has an area 5 cm^2 greater than PQRS?
   c) STUV, which has an area equal to the area of ABCD and PQRS together?

Expressions with 2 Letter Symbols



If PQ = 3 cm and QR = 7 cm, then PR = (3 + 7) cm or 10 cm



If AB = n cm and BC = p cm, then AC = $(n + p)$ cm

Now, if $n = 5$ and $p = 4$,

$$\begin{aligned}\text{then AC} &= (n + p)\text{ cm}\\ &= (5 + 4)\text{ cm}\\ &= 9\text{ cm}\end{aligned}$$

If $n = 8$ and $p = 6$, how long is AC?

IN ACTION

1. Complete.

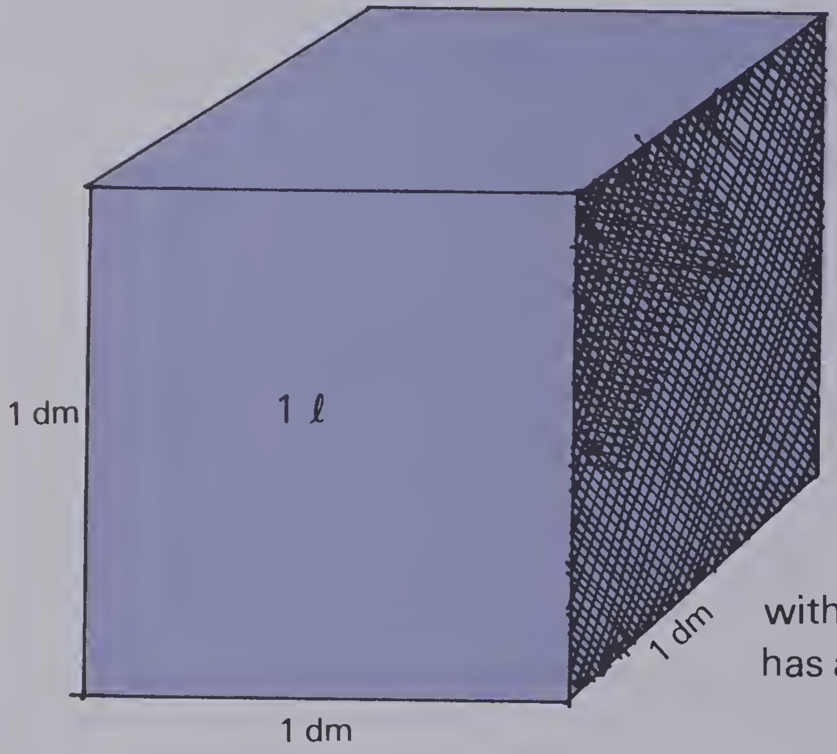
a	b	$a + b$	$a - b$	$a \times b$	$a \div b$
7	5	7 + 5 or 12	7 − 5 or 2	7 × 5 or 35	7 ÷ 5 or 1.4
8	3				
1	0				
10	5				

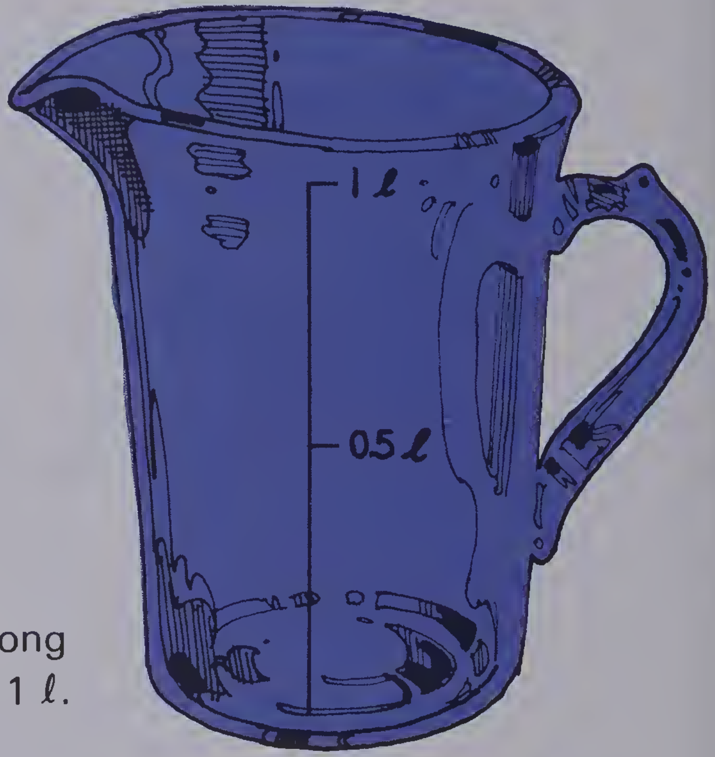
2. If $a = \{2,3\}$ and $b = \{4,7\}$,

$$\begin{aligned}\text{then } a + b &= \{2 + 4, 2 + 7, 3 + 4, 3 + 7\}\\ &= \{\qquad ? \qquad\}\\ \text{and } a \times b &= \{\qquad ? \qquad\}\\ &= \{\qquad ? \qquad\}\end{aligned}$$

EXPLORE

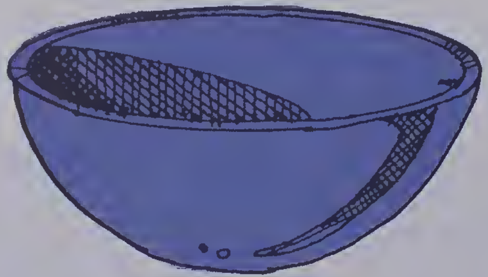
CAPACITY/The Litre ℓ

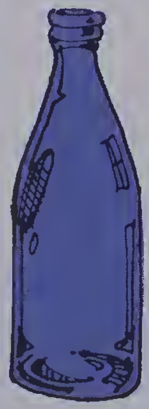


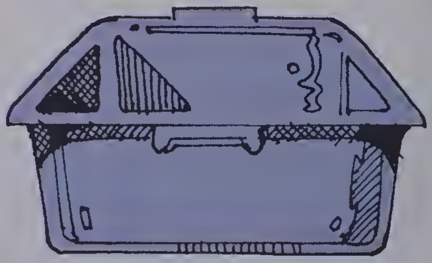


A container
with sides 1 dm long
has a capacity of 1 ℓ.

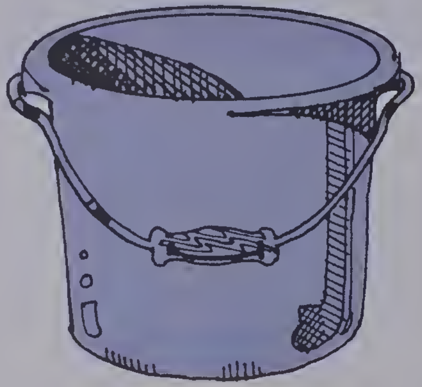
Find several containers.







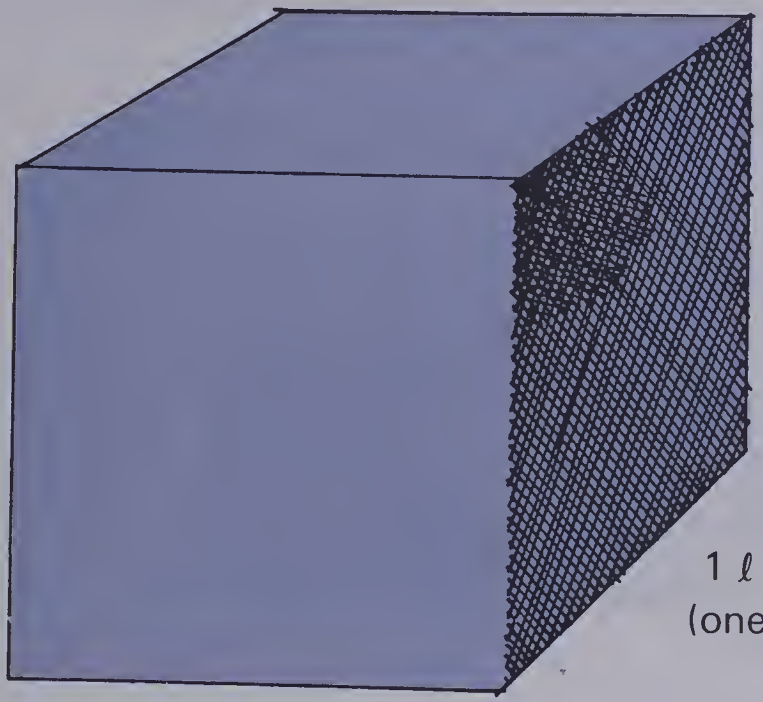
Pour 1 ℓ (one litre) of water into each.
Try to get a good concept of 1 ℓ.

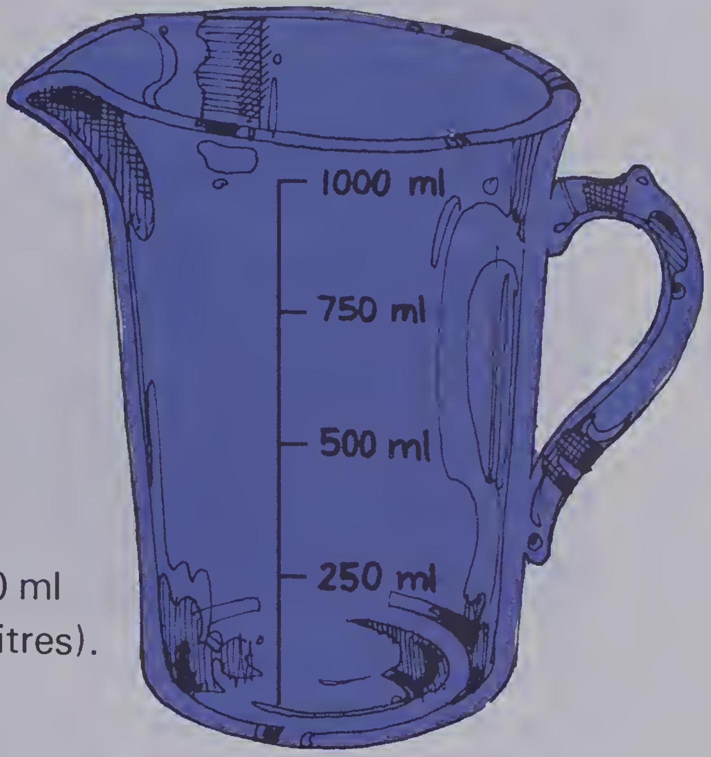


How many litres of water
do you think a bucket will hold?
Pour 1 ℓ of water into your bucket.

Change your estimate if necessary.
Check your estimate.

The Millilitre

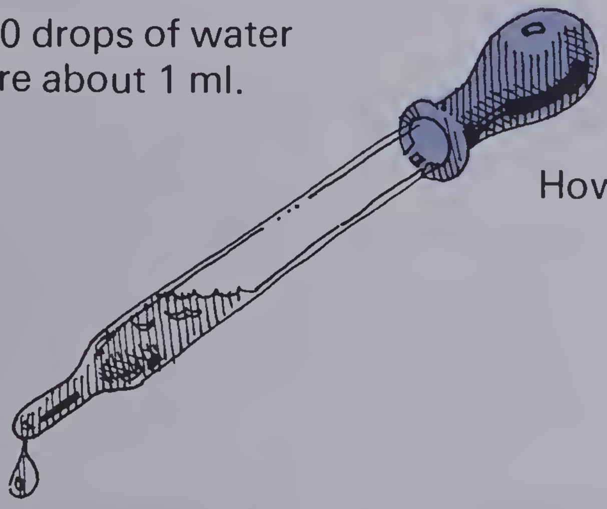




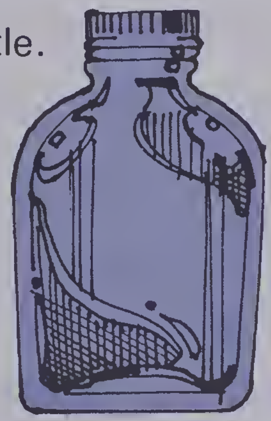
1 ℓ is equal to 1000 ml
(one thousand millilitres).

Try to get a good concept of 1 ml.

20 drops of water
are about 1 ml.



Find a small bottle.

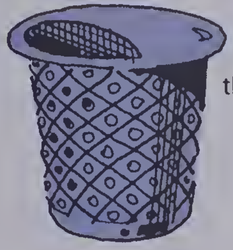


How many millilitres do you think it will hold?
Pour 10 ml of water into the bottle.
Change your estimate if necessary.
Check your estimate.

Estimate, then find the number of millilitres
held by several small containers.

egg cup

paper cup



thimble

bottle cap

IN ACTION

1. Estimate the capacities of some containers. Check your estimate by measuring. Make a chart to keep a record of your findings.

Container	Estimate in litres or millilitres	Measurement	Difference
bottle			
bucket			
glass			

2. Give the dimensions of 2 different containers that would each hold just 1 ℓ. From cardboard, make 1 of the containers.

3. Find a container that will hold less than 10 ml.

4. Make a list of 10 things people buy by the litre.

5. Make a list of 10 things people buy by the millilitre.

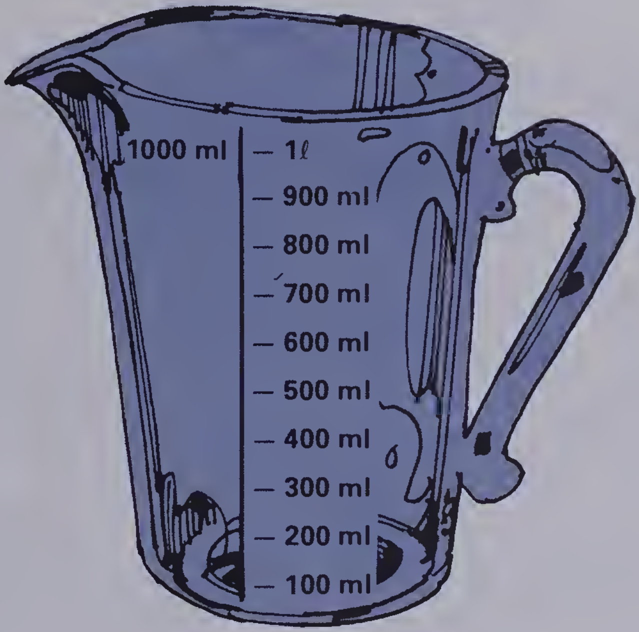
6. Bright Shampoo costs $1.20 for 100 ml. How much would it cost for 1 ml?, for 1 ℓ?

7. Your milk glass holds about 250 ml. About how many litres of milk do you drink in 1 week?

8. About how many drops of water are equivalent to 1 ℓ?

9. Find the cost of 1 ℓ of gasoline. How much would it cost to fill the gas tank of your family car?

Expressing Millilitres in Litres
Expressing Litres in Millilitres



1 ℓ is equivalent to 1000 ml
1 ℓ = 1000 ml

How many millilitres are equivalent to 2 ℓ?

1 ℓ = 1000 ml
2 ℓ = (2 × 1000) ml
2 ℓ = 2000 ml

2 ℓ are equivalent to 2000 ml.

How many millilitres are equivalent to 3.7 ℓ?

1 ℓ = 1000 ml
3.7 ℓ = (3.7 × 1000) ml
3.7 ℓ = 3700 ml

3.7 ℓ are equivalent to 3700 ml.

How many litres are equivalent to 5000 ml?

1000 ml = 1 ℓ
5000 ml = (5000 ÷ 1000) ℓ
5000 ml = 5 ℓ

5000 ml are equivalent to 5 ℓ.

How many litres are equivalent to 8729 ml?

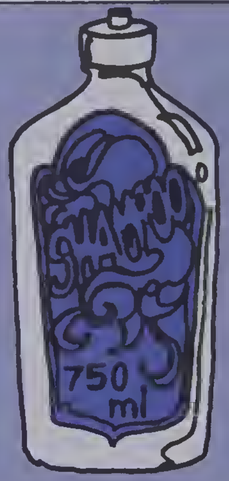
1000 ml = 1 ℓ
8729 ml = (8729 ÷ 1000) ℓ
8729 ml = 8.729 ℓ

8729 ml are equivalent to 8.729 ℓ.

How many millilitres are equivalent to 3 ℓ? 2.5 ℓ?
How many litres are equivalent to 7000 ml? 375 ml?

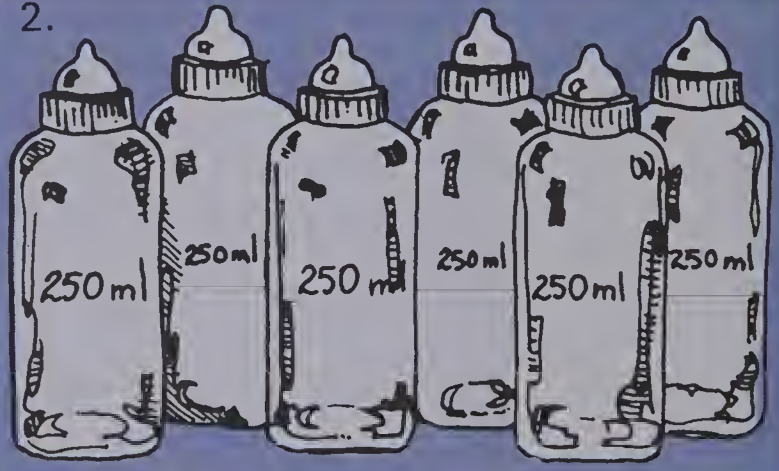
IN ACTION

1.



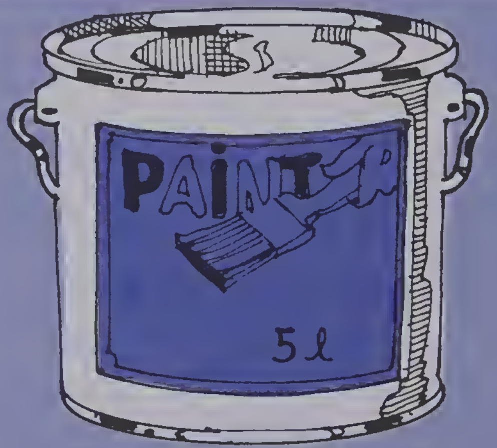
How many litres are equivalent to 750 ml?

2.


250 ml
250 ml
250 ml
250 ml
250 ml
250 ml

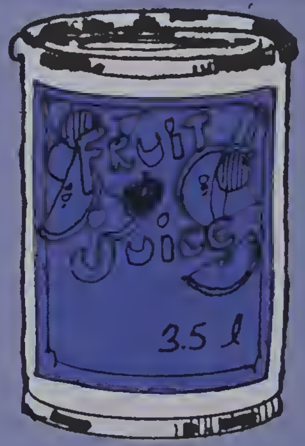
What is the capacity in litres of the 6 bottles?

3.



How many millilitres are equivalent to 5 ℓ?

4.


FRUIT JUICE
3.5 ℓ

How many millilitres are equivalent to 3.5 ℓ?

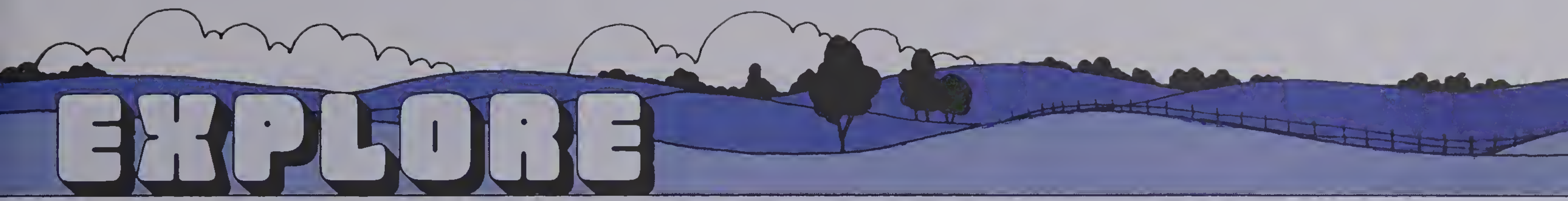
5. Complete.

a) 3 ℓ = ? ml
b) 7000 ml = ? ℓ
c) 5 ℓ = ? ml
d) 1000 ml = ? ℓ
e) 1 ℓ = ? ml
f) 2500 ml = ? ℓ
g) 3.8 ℓ = ? ml
h) 5.25 ℓ = ? ml
i) 6550 ml = ? ℓ

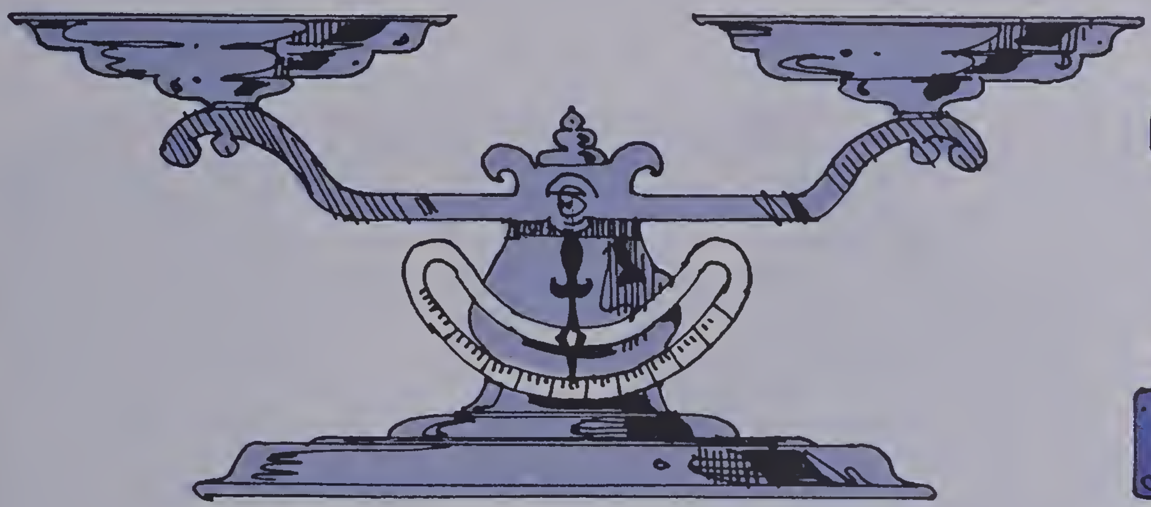
6. Find the capacity of each container.
Record its capacity in millilitres.
Express that measurement in litres.

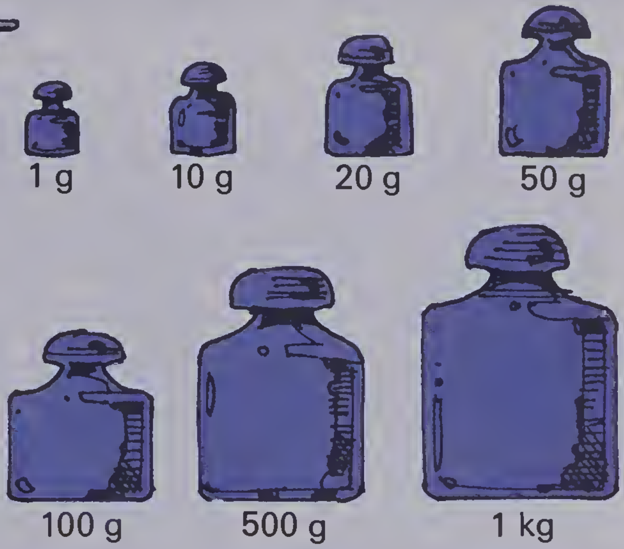
a) a plastic cup
b) a bottle
c) a soft drink container
d) a liquid soap container

EXPLORE



MASS/Kilograms kg/Grams g





Get a set of masses.
Pick up each of the masses in turn.
Try to get a good concept of the mass of each one.

Put a 1 g mass on one side of your scales.
Try to find an object that will balance the scale.
It would take 1000 of these objects to balance 1 kg.

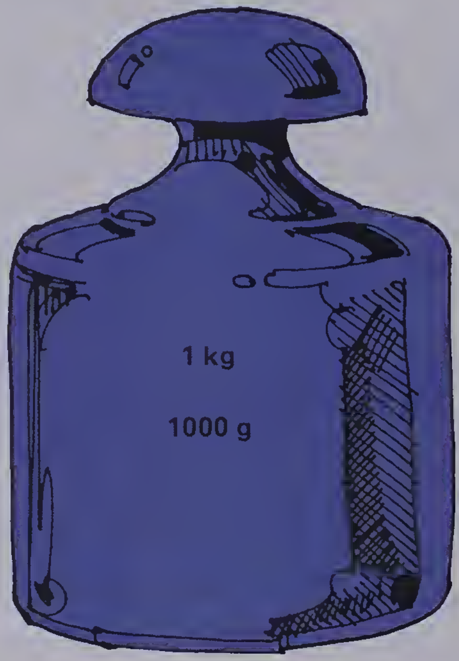
1000 g = 1 kg

Find objects that have masses of about 10 g,
about 20 g, about 100 g, about 500 g, and about 1 kg.

Arrange a display of objects with these masses.
Find the mass of each of these objects.

a paperclip
an apple
1 ℓ of water
1 ml of water
this textbook
10 sheets of paper

Expressing Grams in Kilograms
Expressing Kilograms in Grams



1 kg is equivalent to 1000 g
1 kg = 1000 g

How many grams are equivalent to 2 kg?
1 kg = 1000 g
2 kg = (2 × 1000) g
2 kg = 2000 g

How many grams are equivalent to 2.5 kg?
1 kg = 1000 g
2.5 kg = (2.5 × 1000) g
2.5 kg = 2500 g

How many kilograms are equivalent to 3000 g?
1000 g = 1 kg
3000 g = (3000 ÷ 1000) or 3 kg
3000 g = 3 kg

How many kilograms are equivalent to 2758 g?
1000 g = 1 kg
2758 g = (2758 ÷ 1000) kg
2758 g = 2.758 kg

How many grams are equivalent to 2 kg? 5 kg? 7.5 kg? 1.2 kg?

How many kilograms are equivalent to 4000 g? 1000 g? 3505 g? 1750 g?

IN ACTION

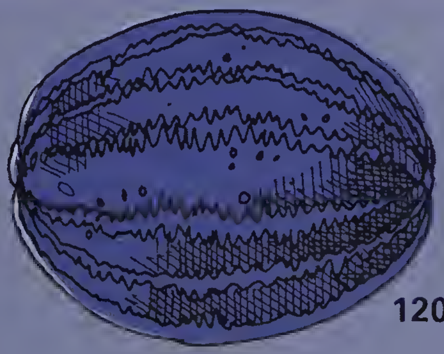
1.

What is the mass in grams?

2.

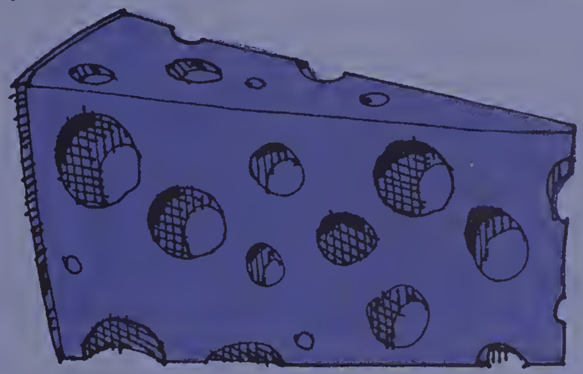
What is the mass in grams?

3.



What is the mass in kilograms?

4.



What is the mass in kilograms?

5. Complete.

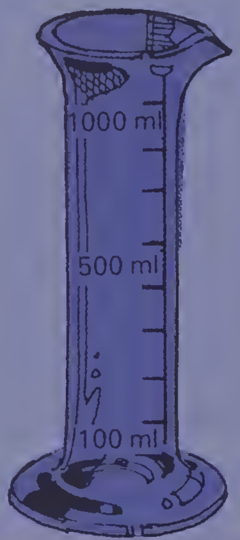
a) 2 kg = ? g b) 3000 g = ? kg c) 4 kg = ? g d) 1000 g = ? kg
e) 3.5 kg = ? g f) 1750 g = ? kg g) 7.7 kg = ? g h) 7000 g = ? kg
i) 1.75 kg = ? g j) 2500 g = ? kg k) 2.368 kg = ? g l) 0.575 kg = ? g

6. Find the mass of each object. Record its mass in grams.
Express that measurement in kilograms.

a) this textbook b) a shoe c) 1 ℓ of water d) a telephone book

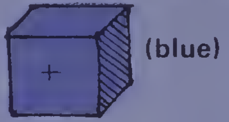
Measurement Games

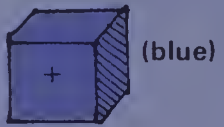
Make a set of dice for each game. Use wooden cubes.
(You could cover sugar cubes with masking tape.)
Mark the values on each face.

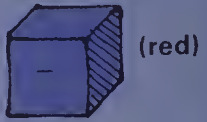


FILL A LITRE

Mark each cube as shown.

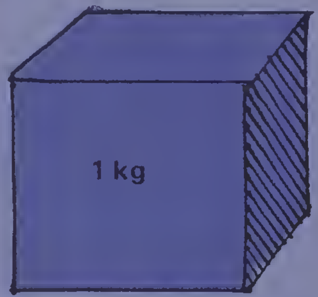






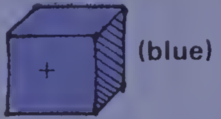
50 ml	200 ml	0.05 ℓ	0.2 ℓ	50 ml	50 ml
100 ml	250 ml	0.1 ℓ	0.25 ℓ	100 ml	100 ml
150 ml	300 ml	0.15 ℓ	0.3 ℓ	150 ml	150 ml

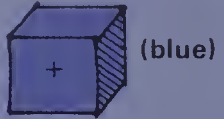
Let's Play. Roll 3 dice. Add the blue values and subtract the red.
There can be any number of players.
Each player keeps his or her own score.
The winner is the first player to score exactly 1000 ml (1 ℓ).

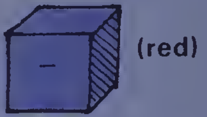


"SCORE" A KILOGRAM

Mark each cube as shown.





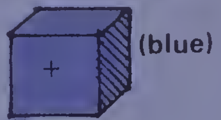


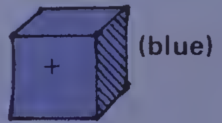
50 g	200 g	0.05 kg	0.2 kg	50 g	50 g
100 g	250 g	0.1 kg	0.25 kg	100 g	100 g
150 g	300 g	0.15 kg	0.3 kg	150 g	150 g

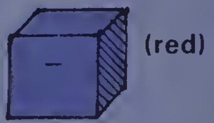
Rules are the same as for Fill a Litre.

JOG A KILOMETRE

Mark each cube as shown.





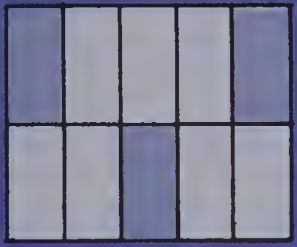
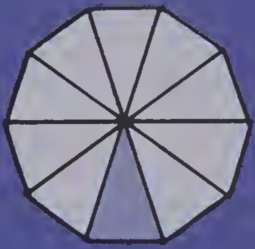
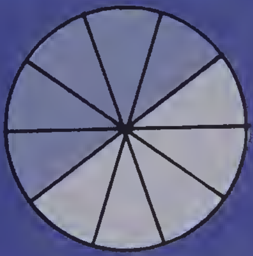
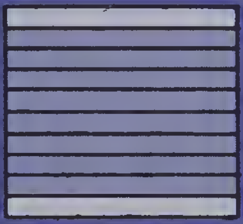
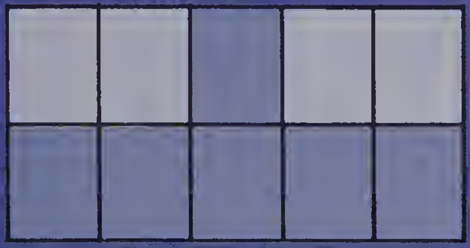
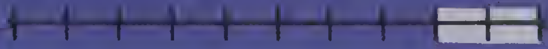
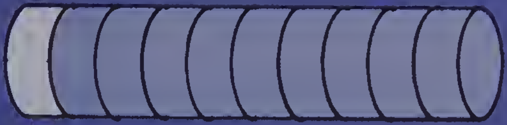
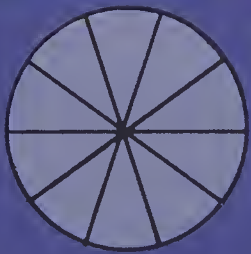
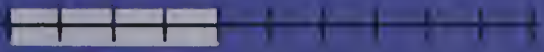
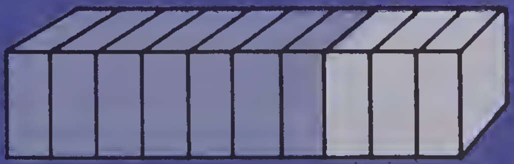


50 m	200 m	0.05 km	0.2 km	50 m	50 m
100 m	250 m	0.1 km	0.25 km	100 m	100 m
150 m	300 m	0.15 km	0.3 km	150 m	150 m

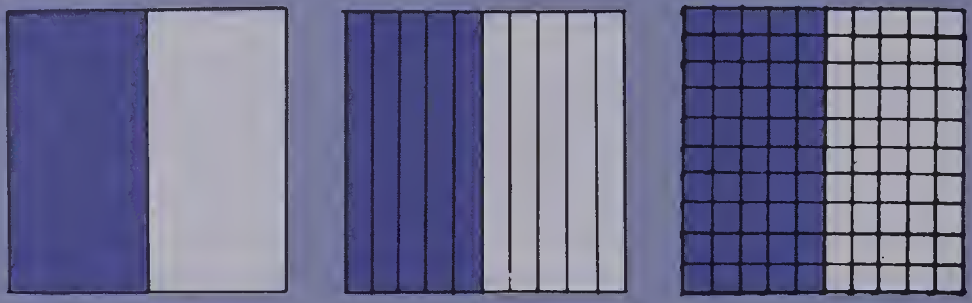
Rules are the same as for Fill a Litre.

FRACTIONS / Equivalent Fractions and Decimals

Complete the chart in your notebook.

DIAGRAM	FRACTION	DECIMAL	DIAGRAM	FRACTION	DECIMAL
a) 	$\frac{3}{10}$	0.3	b) 	$\frac{1}{10}$	0.1
c) 		0.5	d) 		
e) 			f) 		
g) 			h) 		
i) 			j) 		

Study and complete.

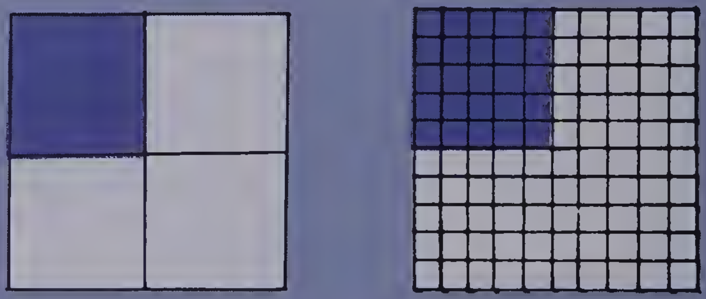


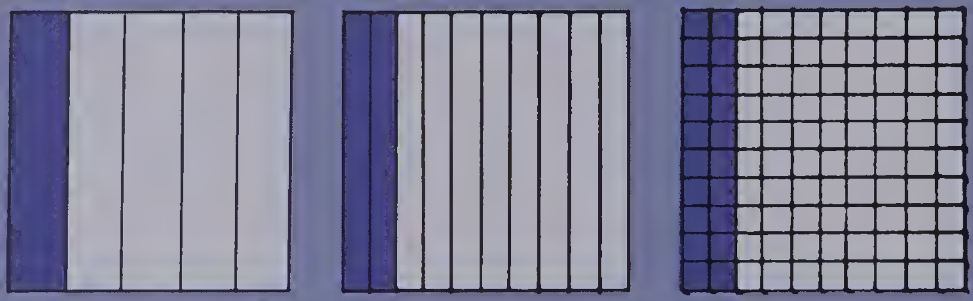
$$\frac{1}{2} = \frac{5}{10} = \frac{50}{100}$$

$$\frac{1}{2} = 0.5 = 0.50$$

$$\frac{1}{4} = \frac{25}{100}$$

$$\frac{1}{4} = 0.25$$



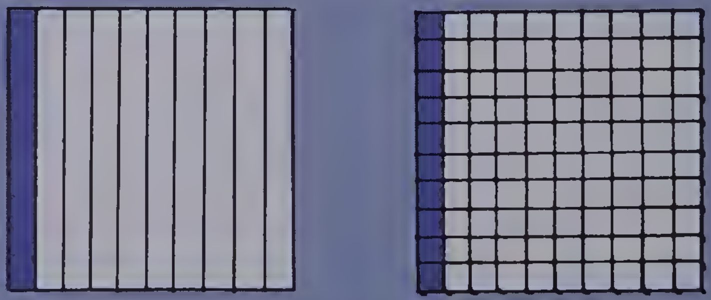


$$\frac{1}{5} = \frac{2}{10} = \frac{20}{100}$$

$$\frac{1}{5} = \quad ? \quad = \quad ?$$

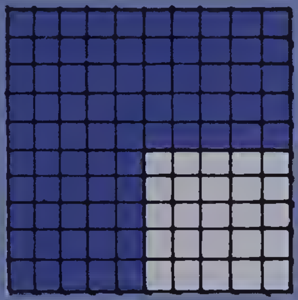
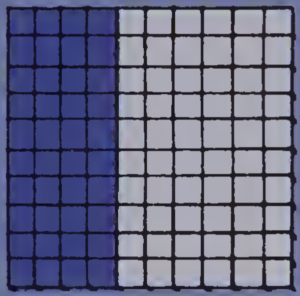
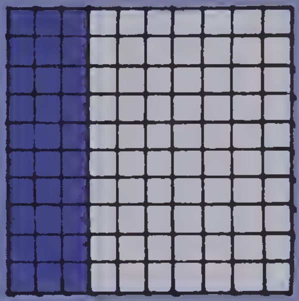
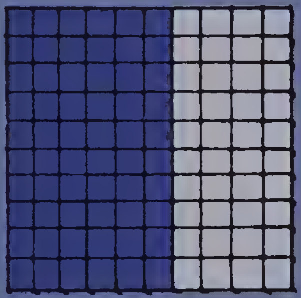
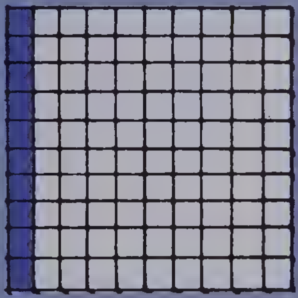
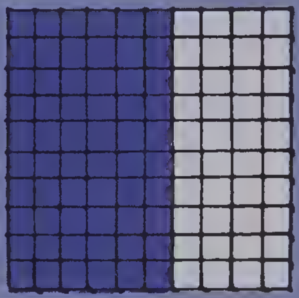
$$\frac{1}{10} = \frac{10}{100}$$

$$\frac{1}{10} = \quad ?$$



IN ACTION

1. Complete the chart.

DIAGRAM	FRACTION	DECIMAL	DIAGRAM	FRACTION	DECIMAL	DIAGRAM	FRACTION	DECIMAL
a) 	$\frac{?}{4}$	?	b) 	$\frac{4}{?}$	?	c) 	$\frac{?}{10}$	?
d) 	$\frac{6}{?}$	?	e) 	$\frac{?}{100}$	?	f) 	?	?

2. Express as a decimal (in tenths).

a) $\frac{1}{2}$ b) $\frac{1}{5}$ c) $\frac{2}{5}$ d) $\frac{3}{5}$ e) $\frac{4}{5}$ f) $\frac{5}{5}$

3. Express as a decimal (in hundredths).

a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{2}{10}$ d) $\frac{4}{10}$ e) $\frac{6}{10}$ f) $\frac{9}{10}$

4. Write 2 decimals for each fraction.

a) $\frac{1}{2}$ b) $\frac{1}{5}$ c) $\frac{1}{10}$ d) $\frac{3}{5}$ e) $\frac{3}{10}$ f) $\frac{5}{10}$

g) $\frac{2}{5}$ h) $\frac{2}{10}$ i) $\frac{4}{10}$ j) $\frac{4}{5}$ k) $\frac{6}{10}$ l) $\frac{8}{10}$

Another Meaning of a Fraction

Another meaning for $\frac{1}{2}$ is $1 \div 2$ $\qquad 1 \div 2 = \ ?$

$$\begin{array}{r} 0.5 \\ 2\overline{)1.0} \\ \underline{10} \end{array}$$

Another meaning for $\frac{1}{4}$ is $1 \div 4$ $\qquad 1 \div 4 = \ ?$

$$\begin{array}{r} 0.25 \\ 4\overline{)1.00} \\ \underline{8} \\ 20 \\ \underline{20} \end{array}$$

IN ACTION

1. What is the other meaning?

a) $\frac{2}{4}$ b) $\frac{1}{5}$ c) $\frac{1}{10}$ d) $\frac{3}{5}$ e) $\frac{7}{10}$ f) $\frac{5}{10}$

g) $\frac{3}{4}$ h) $\frac{2}{5}$ i) $\frac{3}{10}$ j) $\frac{4}{5}$ k) $\frac{6}{10}$ l) $\frac{9}{10}$

m) $\frac{1}{4}$ n) $\frac{2}{10}$ o) $\frac{4}{10}$ p) $\frac{7}{10}$ q) $\frac{8}{10}$ r) $\frac{1}{2}$

2. Express as a fraction (in tenths).

a) 0.50 b) 0.20 c) 0.70 d) 0.40 e) 0.80 f) 0.30

3. Express as a fraction (in hundredths).

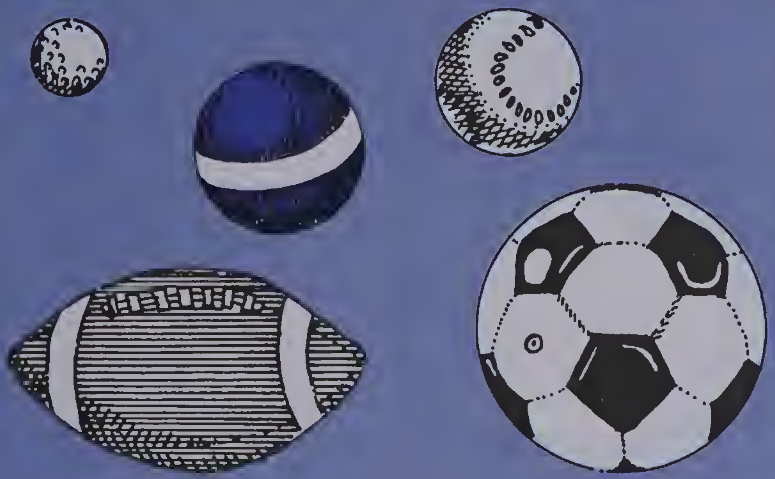
a) 0.1 b) 0.6 c) 0.9 d) 0.25 e) 0.5 f) 0.7

4. Complete.

a) $4\overline{)3}$ b) $5\overline{)1}$ c) $10\overline{)2}$ d) $5\overline{)3}$ e) $10\overline{)5}$

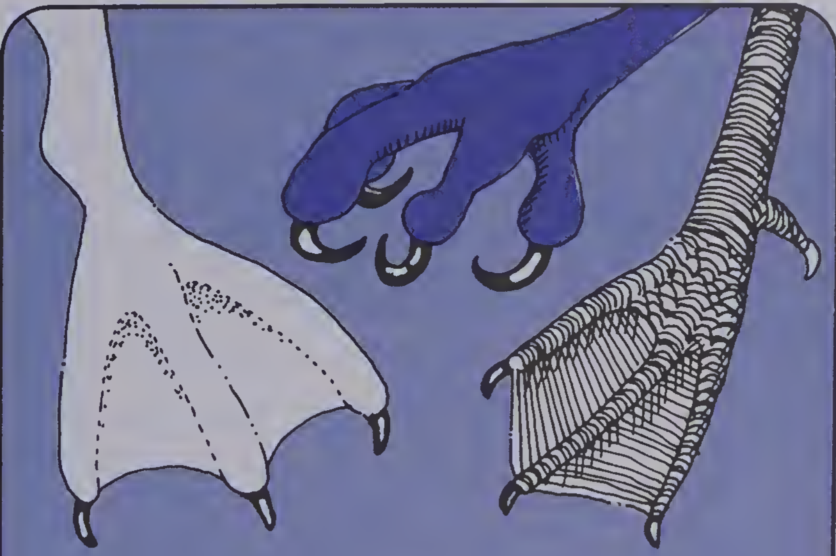
f) $100\overline{)15}$ g) $5\overline{)4}$ h) $100\overline{)45}$ i) $10\overline{)8}$ j) $100\overline{)75}$

A Fraction of a Group



5 balls
4 of the balls are round

$\frac{4}{5}$ of the balls are round

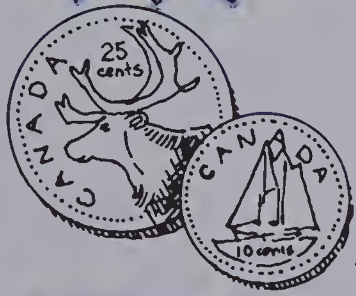


3 bird feet
2 of the feet are webbed

$\frac{2}{3}$ of the feet are webbed

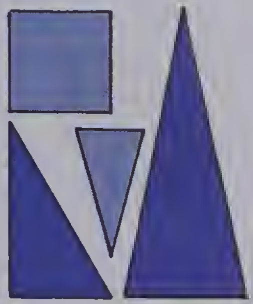
IN ACTION

1. Complete.


25 cents
CANADA
CANADA
10 cents

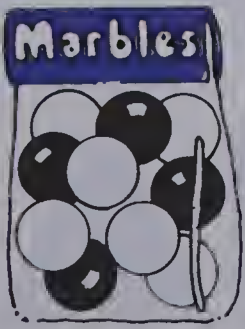
a)

2 coins
1 of the coins is a quarter
? of the coins are quarters



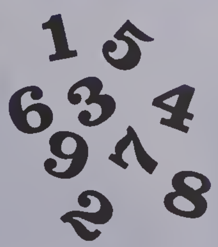
b)

4 shapes
? of the shapes are triangles
? of the shapes are triangles



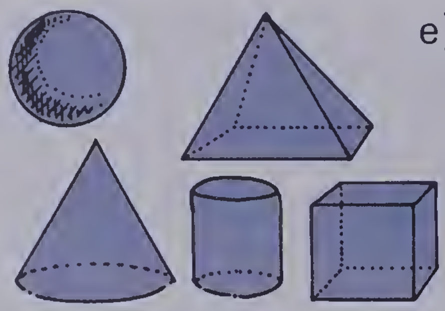
c)

10 marbles
? of the marbles are coloured
? of the marbles are coloured



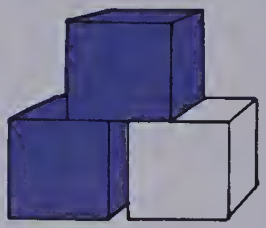
d)

? numbers
? of the numbers are even
? of the numbers are even



e) ? models
? of the models
have curved surfaces

? of the models
have curved surfaces



f) ? centicubes
? of the cubes
are coloured

? of the cubes
are coloured

2. What is the fraction?

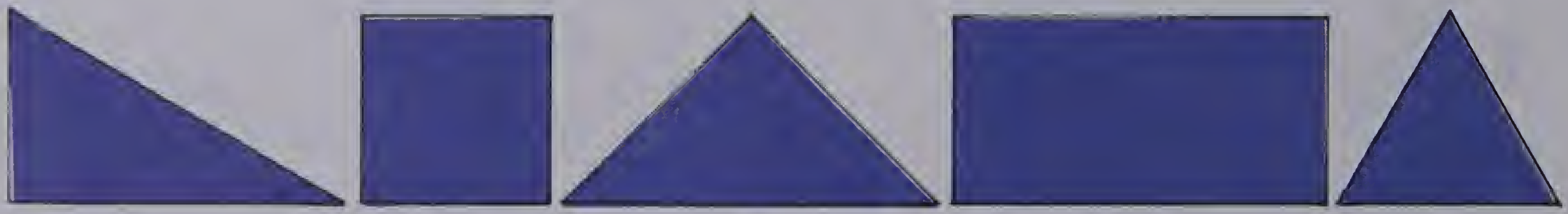
   a) 4 horses, 3 are mares
   b) 10 fish, 7 are guppies
   c) 2 snakes, 1 is a milk snake
   d) 8 flowers, 6 are roses
   e) 3 numbers, 1 is even
   f) 5 birds, 4 are robins
   g) 100 stamps, 25 are cancelled
   h) 3 batteries, 1 is dead
   i) 10 automobiles, 3 are sports cars
   j) 100 apples, 13 are bruised

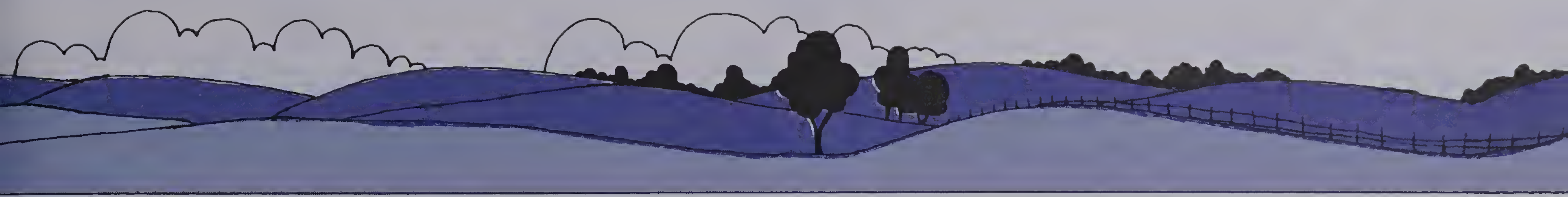
3. Laura-Anne John Peggy Scott Pamela Fred Betty George Kay Steve

   What fraction of the names
   a) are girls
   b) are boys
   c) have only 4 letters
   d) have only 3 letters
   e) have 3 or more vowels
   f) have double letters?

4.

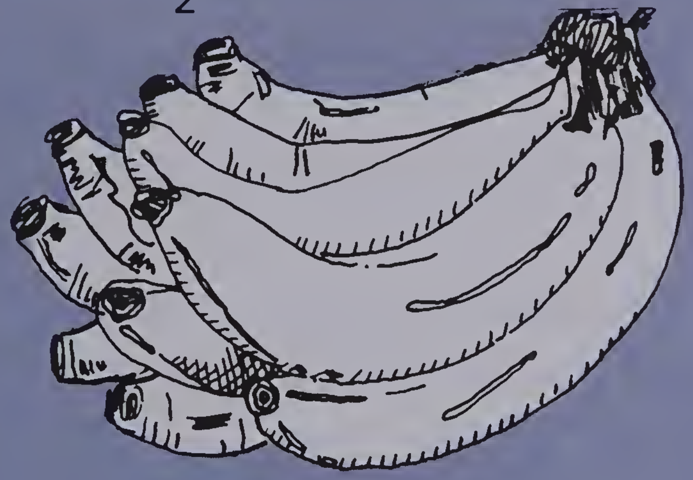
   What fraction of the shapes
   a) are triangles
   b) have 4 sides
   c) have only 1 right angle
   d) have 2 or more equal sides
   e) have all sides equal
   f) have fewer sides than a pentagon?





A Fraction of a Group

What is $\frac{1}{2}$ of this bunch of bananas?



$$\frac{1}{2} \text{ of } 10 = \frac{10}{2}$$
$$= 5$$

What is $\frac{1}{10}$ of 100 apples?

$$\frac{1}{10} \text{ of } 100 = \frac{100}{10}$$
$$= 10$$

IN ACTION

1. Complete.

a) $\frac{1}{2}$ of $4 = \frac{4}{2}$
$= ?$

b) $\frac{1}{3}$ of $9 = \frac{9}{3}$
$= ?$

c) $\frac{1}{4}$ of $16 = \frac{16}{?}$
$= ?$

d) $\frac{1}{5}$ of $25 = \frac{25}{?}$
$= ?$

e) $\frac{1}{10}$ of $30 = ?$
$= ?$

f) $\frac{1}{100}$ of $200 = ?$
$= ?$

2. Solve.

a) What is $\frac{1}{2}$ of 10?

b) What is $\frac{1}{3}$ of 24?

c) What is $\frac{1}{4}$ of 36?

d) What is $\frac{1}{5}$ of 20?

e) What is $\frac{1}{8}$ of 24?

f) What is $\frac{1}{10}$ of 50?

g) What is $\frac{1}{100}$ of 100?

h) What is $\frac{1}{2}$ of 28?

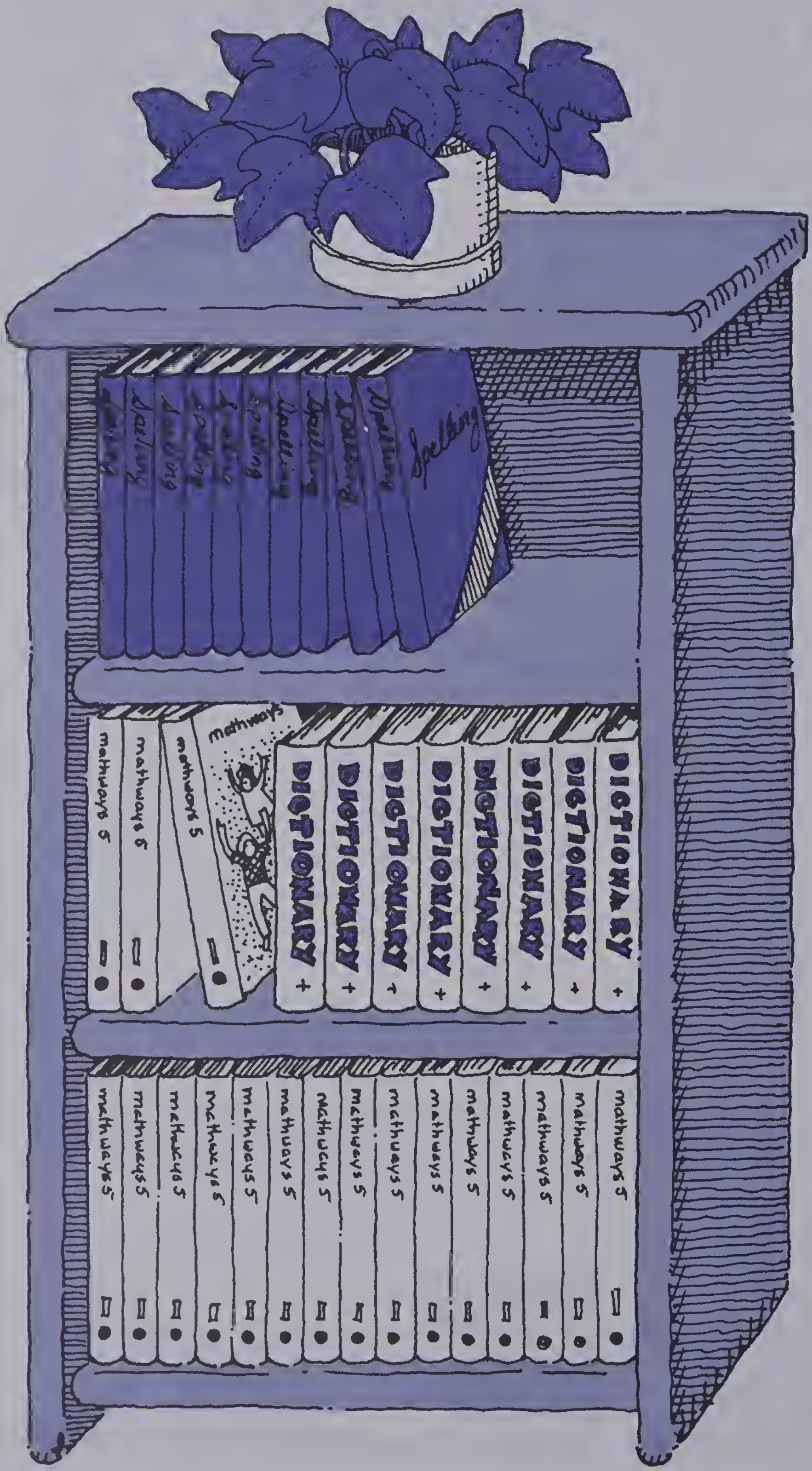
i) What is $\frac{1}{4}$ of 40?

j) What is $\frac{1}{5}$ of 70?

k) What is $\frac{1}{10}$ of 70?

l) What is $\frac{1}{100}$ of 300?

3. Mr. Profit asked 3 of his students, Franco, Jerry and Cecelia, to check the books in this bookcase.



They were asked to count them. There were 36 books on the 3 shelves.

a) They found that $\frac{1}{2}$ of the books were *mathways.* How many *mathways* were there?

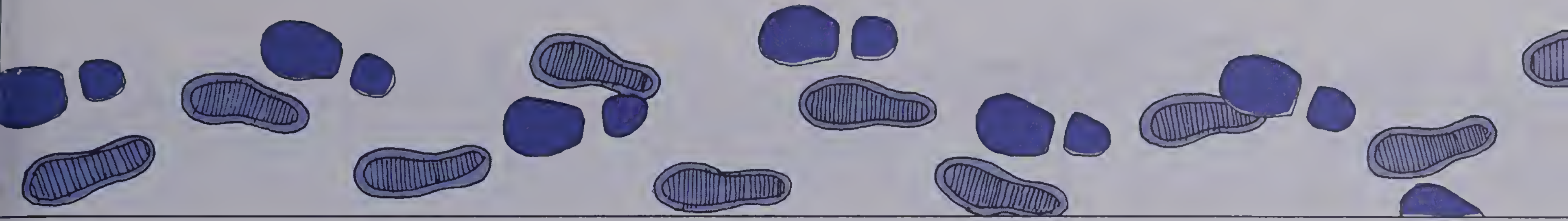
b) There were 8 dictionaries. They said that $\frac{1}{4}$ of them needed new covers. How many books needed new covers?

c) They found that $\frac{3}{10}$ of the Spellers had pages missing. How many Spellers did not have pages missing?

d) While checking the dictionaries, they found that $\frac{1}{2}$ of them were brand new. How many is this?

e) The 3 students took $\frac{1}{2}$ of the *mathways* to another bookshelf. How many *mathways* were left in this bookcase?

f) Look at the bookcases in your classroom. Make up 2 problems. Give them to a friend to solve.



Retrace Your Steps

1. What is the diameter of a circle if the radius is
   a) 4 cm b) 15 mm c) 20 cm d) 7.5 cm e) 0.7 m f) 35.5 mm?

2. What is the radius of a circle if the diameter is
   a) 10 cm b) 6 cm c) 30 mm d) 0.8 m e) 3 cm f) 21 cm?

3. 20 drops of water measure about 1 ml.
   If a tap drips 50 times in 1 min, how many minutes will it take to drip
   a) 100 ml b) 1ℓ of water?

4. How many times will you have to fill a 250 ml cup to have 1ℓ?

5. a) If gasoline costs 25¢/ℓ, how much will 4ℓ cost?
   b) How much will it cost to fill a tank with a capacity of 40ℓ?

6. Express each as a ratio in 2 different ways (3:6 or $\frac{3}{6}$).
   a) 4 red cards; 2 black cards b) 6 girls; 2 boys c) 12 cookies; 4 boys
   d) 1 teacher; 30 pupils e) 10 pencils; 5 girls f) 3 wins; 1 loss

7. 3 students played 8 rounds of a game. Complete the chart.

Players	Games Won	Games Lost	Games Tied	Games Played	Ratio of Games Won to Games Played	Ratio of Games Won to Games Lost	Ratio of Games Won to Games Tied
Tony	3	4	1				
Shelagh	4	2	2				
Gloria	1	6	1				

8. Express each as a per cent.
   a) 60:100 b) $\frac{30}{100}$ c) 50:100 d) $\frac{50}{100}$ e) 12:100 f) $\frac{45}{100}$
   g) 30.5:100 h) 38:100 i) 5:100 j) $\frac{3}{100}$ k) 91.5:100 l) $\frac{46}{100}$

9. Write a fraction for each per cent.
   a) 80% b) 65% c) 14% d) 16.5% e) 4% f) 25% g) 7.5% h) 1%

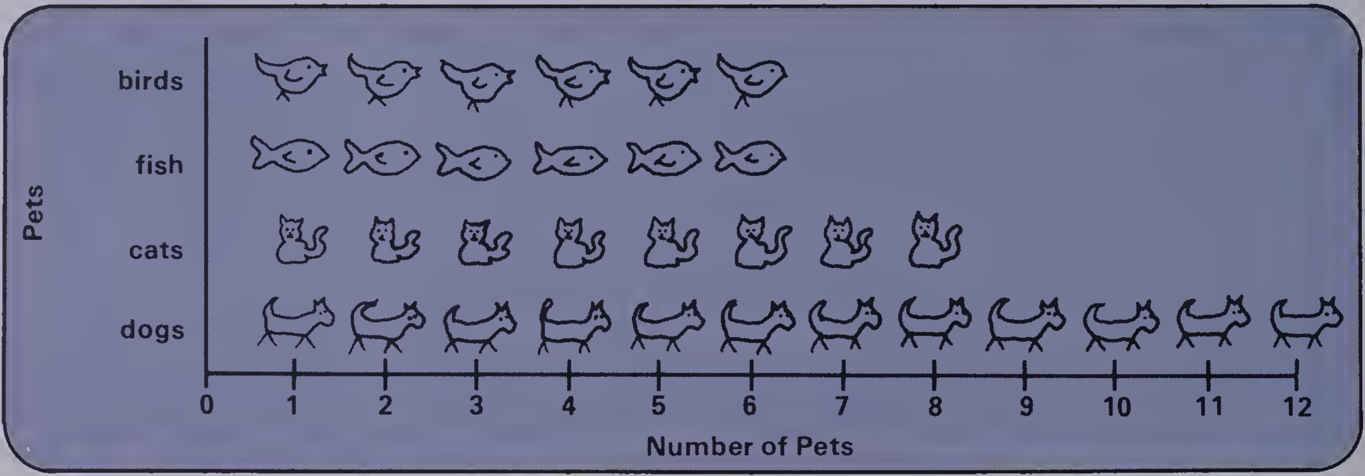
10. Write the ratio for each per cent.
    a) 95% b) 30% c) 24.8% d) 2.5% e) 99.9% f) 50% g) 16.8%

EXPLORE

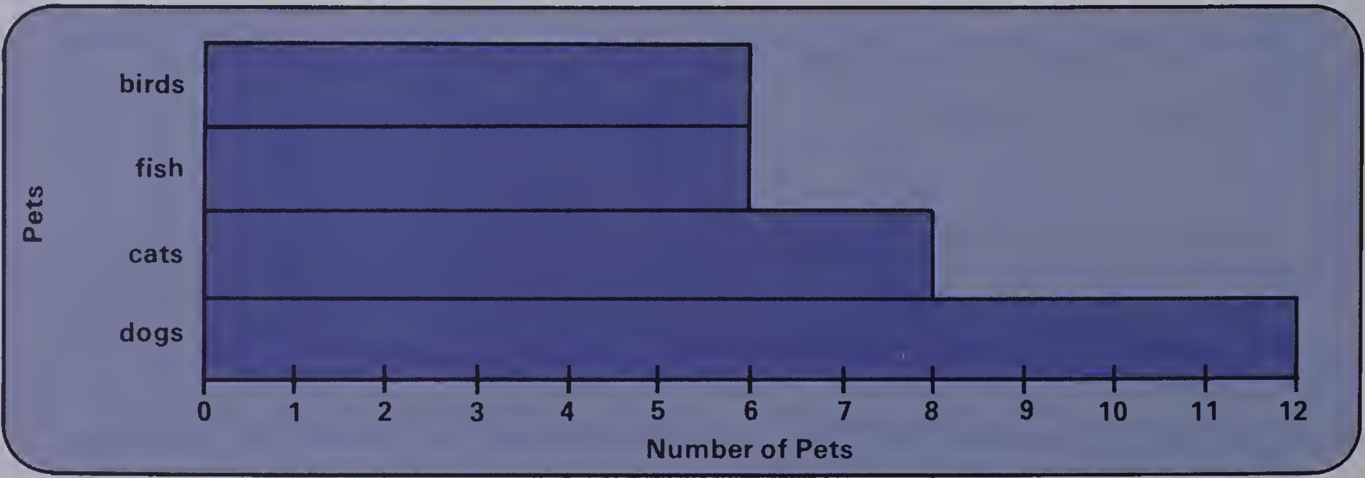
GRAPHS

The Grade 5 class of Mountain View School
made a survey of the pets owned by the members of their class.
There were 6 birds, 6 fish aquariums, 8 cats, and 12 dogs.

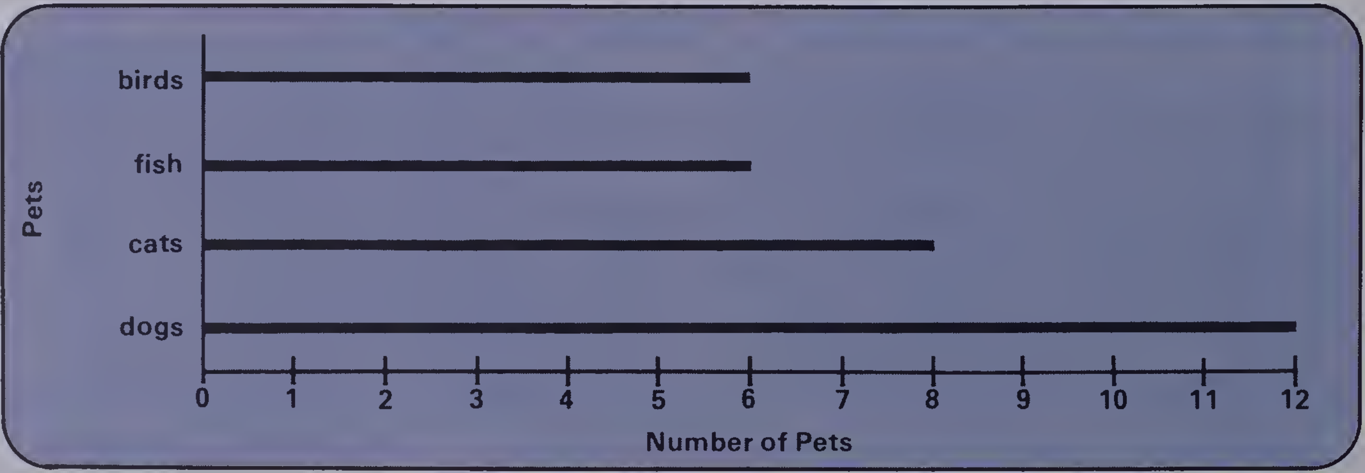
Say it with
a pictograph.



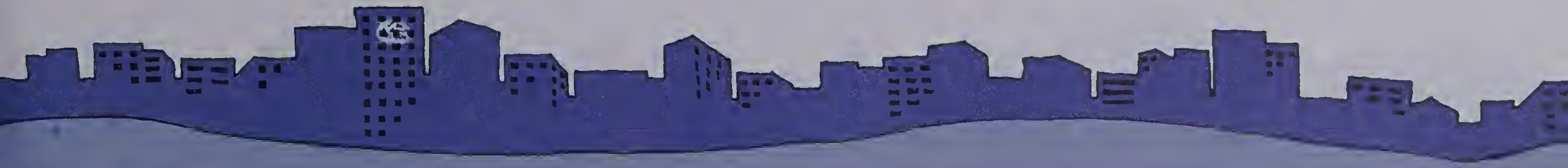
Say it with
a bar graph.



Say it with
a line graph.



Which graph shows the information best? Why?



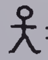
IN ACTION

1. Why is it easier to read a graph to find the number of dogs that are pets than to read a paragraph for the information?

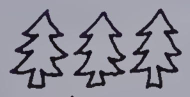
2. Sometimes the type of graph we draw depends on the type of information we have. Which type of graph would you use to represent each of the following?

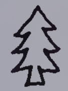
a) the length of icicles on the roof
b) the number of boys and the number of girls in a group
c) the temperature of your room at 10:00 each day for 1 week
d) the different types of vehicles passing your school in 10 min
e) the amount of money saved by each of 5 students
f) the distances between your home and 5 towns

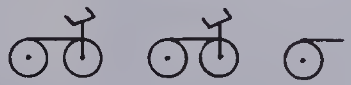
3. If you are representing 8 people, why is it not a good idea to use this scale for a pictograph?

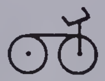
 = 3 people

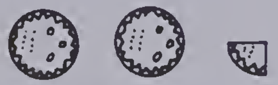
4. Tell what each pictograph represents.

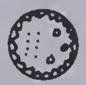
a) 

Scale:  represents 50 trees

b) 

Scale:  represents 4 bicycles

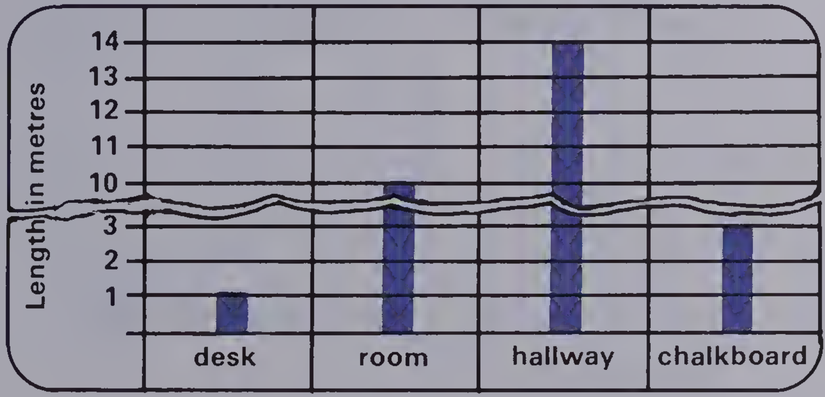
c) 

Scale:  represents 8 pies

5. Complete.

a) 15 units represent 15 books, 1 unit represents ?
b) 10 units represent $500, 1 unit represents ?
c) 15 units represent 50 bicycles, ? units represent 10 bicycles

6. This is the way we draw a bar graph for this data.



Item	Desk	Room	Hallway	Chalkboard
Length	1 m	10 m	14 m	3 m

Draw a graph for this data.

Team	A	B	C	D	E
Score	5	60	55	4	8

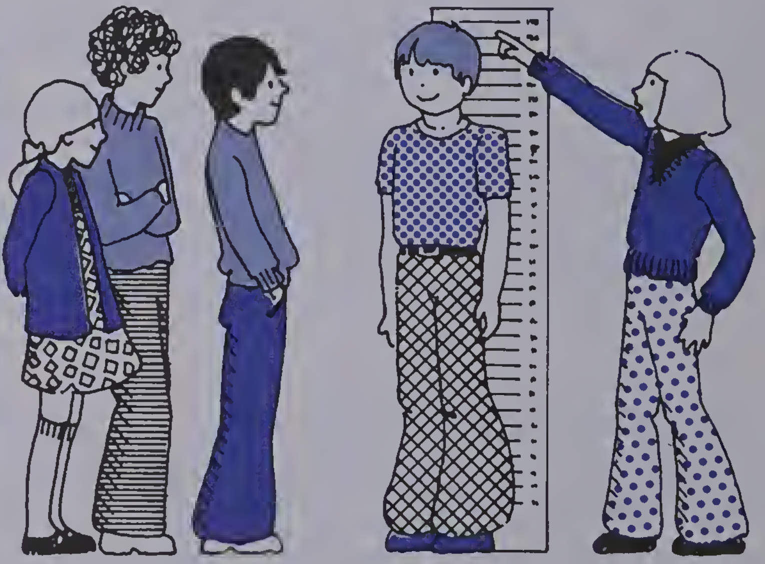
7. The highest point of land for each of the 7 continents is given to the nearest 100 m.

Continent	Highest Point of Land	Height
Africa	Kilimanjaro	5900 m
Asia	Everest	8800 m
North America	McKinley	6200 m
South America	Aconcagua	7000 m
Europe	Elbrus	5600 m
Australia	Kosciusko	2200 m
Antarctica	Vinson Massif	5100 m

Order the heights from greatest to least.
Draw a bar graph showing the information.
Write 5 questions to ask about your graph.

8. Here is a table of the average height of boys and girls.

Age	Boys (height in centimetres)	Girls (height in centimetres)
7	122	121
8	128	127
9	134	132
10	137	138
11	143	145
12	149	151



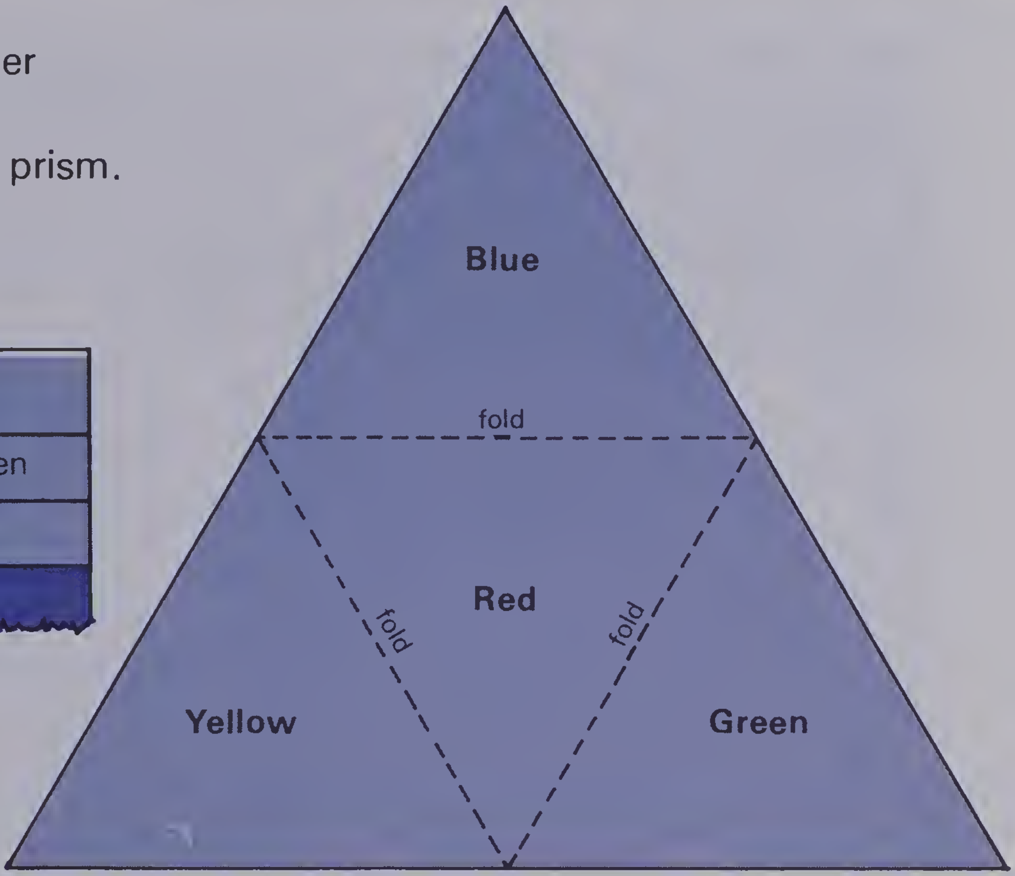
Draw a line graph for the heights of the boys and another for the heights of the girls.
Compare your 2 graphs.
Write 5 questions to ask about your 2 graphs.
Show this information on 1 graph.

9. Gino opened his money bank.
He had: 3 pennies, 5 nickels, 2 dimes, 7 quarters.
Draw a pictograph to illustrate his savings.

10. Draw a graph for this temperature data.
normal body temperature 37°C
room 20°C water freezes 0°C
swimming weather 30°C

Straight Line Graphs

Trace this pattern on light cardboard. Number the faces 1 to 4. Score the fold lines, and tape the edges together to form a triangular prism.



Make a tally sheet like this one.

Number of times each face lands face down			
Red	Blue	Yellow	Green
///	𝍸	///	////

From a height of 1 m from the floor, toss your triangular prism. Record which face landed on the floor. Continue for 25 tosses. Draw a straight line graph for your results. What conclusions can you draw after 25 tosses?

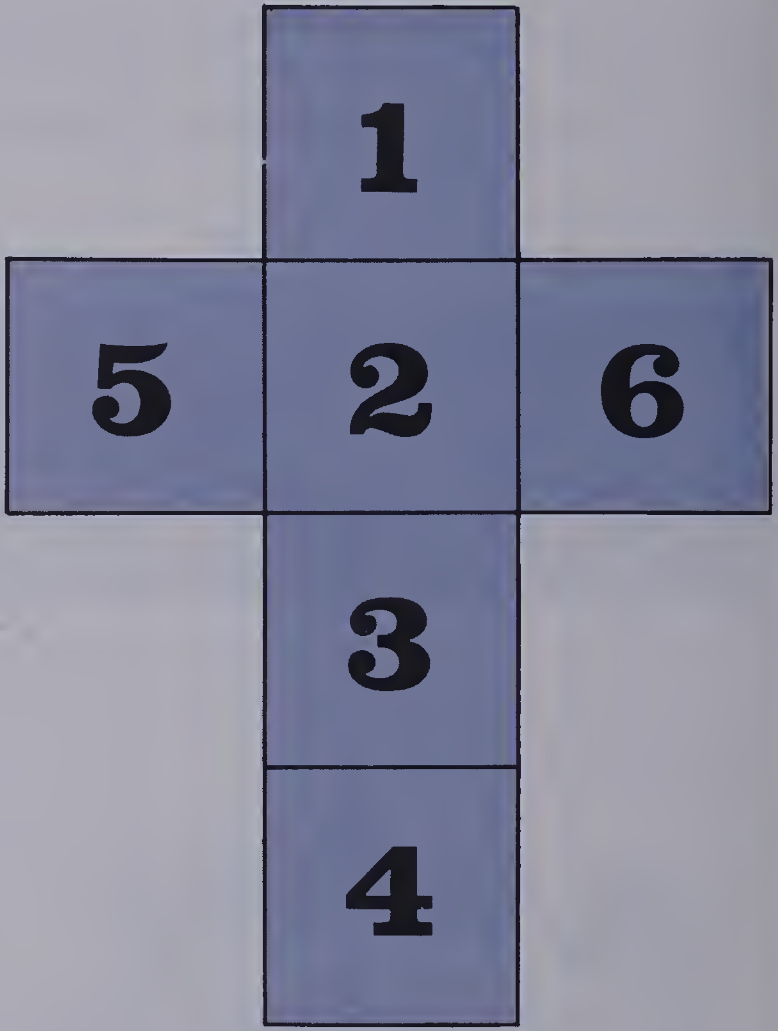
Continue your tally for 50 tosses. Draw a straight line graph for the results. What conclusions can you draw now?

Continue the above procedure for 100 tosses. Compare your data with the data collected by another student. What conclusions can you draw?

Tell whether you think it is fair to compare these 2 sets of data when 2 models have been used. Why?

Construct a cube. Number the faces 1 to 6.
Make a tally like this one.

Number of times each face lands up					
1	2	3	4	5	6



From a height of 1 m, toss the cube on the floor.
Record the number that faces up.
Record your results for another 24 tosses.
Draw a straight line graph for your results.
What do you notice after 25 tosses?
Can you make any predictions?

Make a straight line graph after 50 tosses, after 75 tosses, and after 100 tosses.

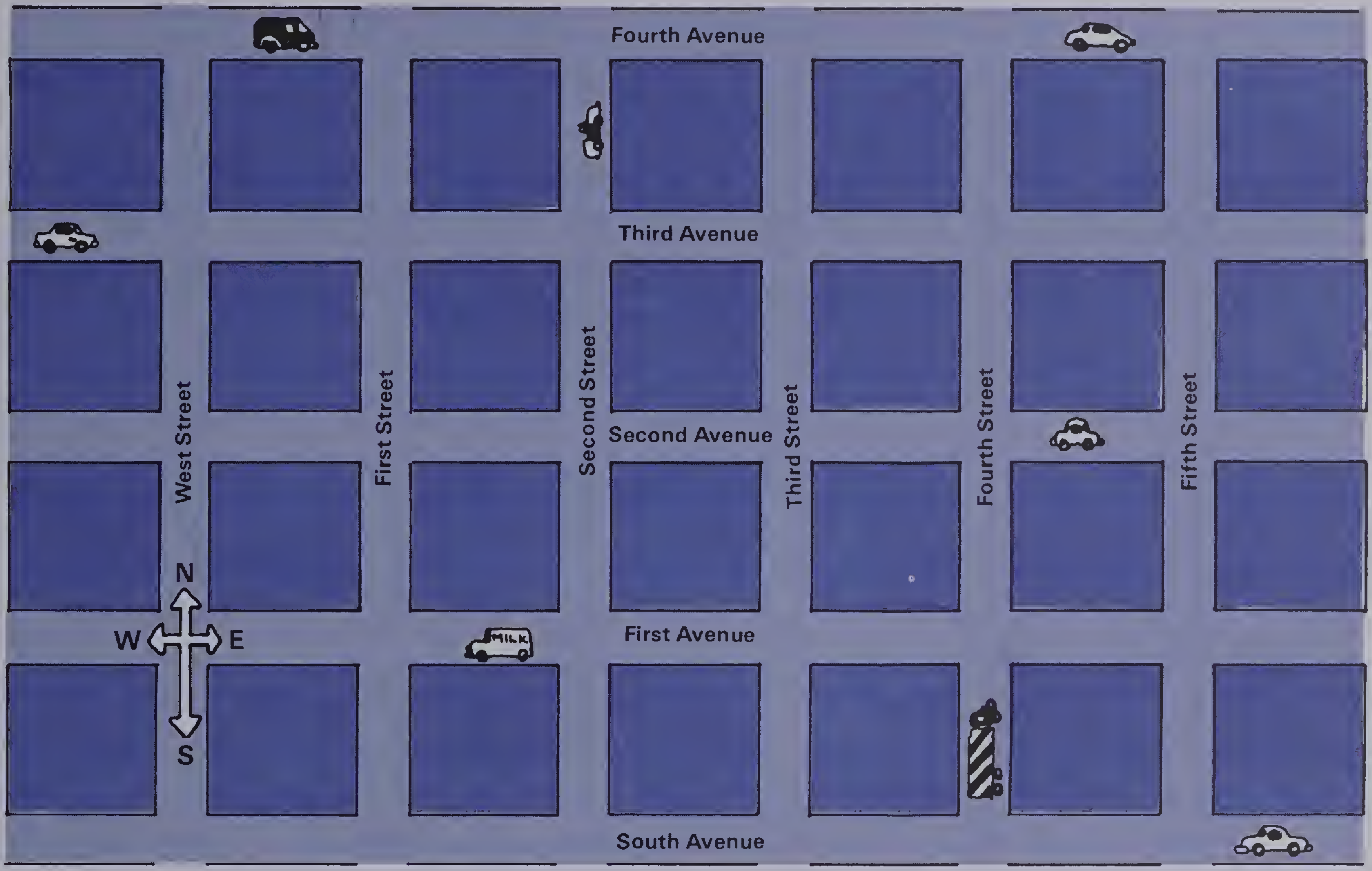
Which number came up the greatest number of times in 25 tosses?
Which number came up the greatest number of times in 50, 75, and 100 tosses?
What conclusions can you draw?
What might happen if you tossed your cube 500 times? 1000 times?

Try this experiment with other geometric models. Which model do you think is the best for this type of activity? Why?

Try rolling the models instead of dropping them. Which method do you think is better? Why?

EXPLORE

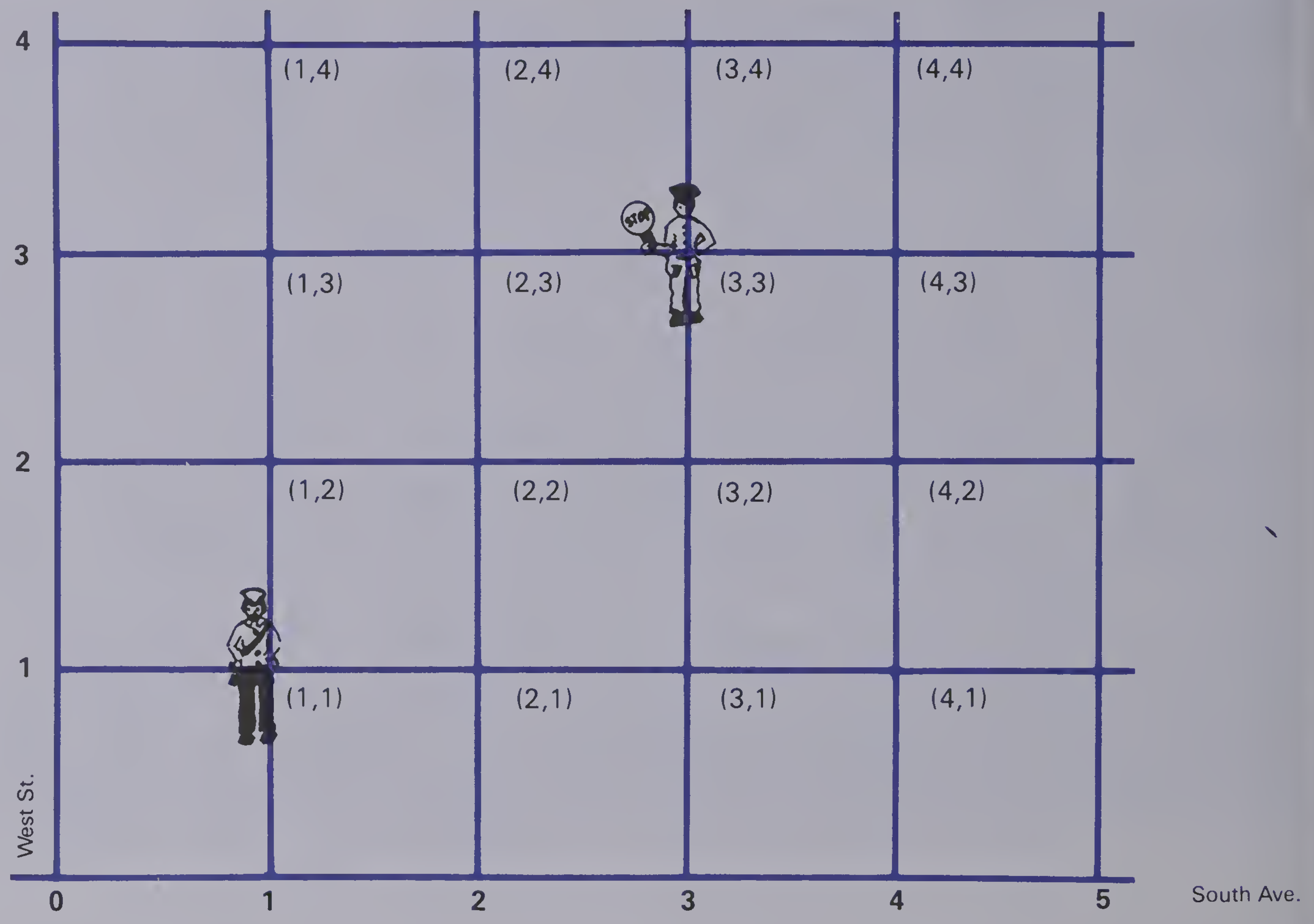
ORDERED PAIRS/Naming Positions


Fourth Avenue
Third Avenue
Second Avenue
First Avenue
South Avenue
West Street
First Street
Second Street
Third Street
Fourth Street
Fifth Street
N
W
E
S
MILK

Here is a plan of some streets in a modern city. The north-south streets are named West St., First St., Second St., Third St., and so on. The east-west streets are named South Ave., First Ave., Second Ave., Third Ave., and so on. Find the intersections: A police officer is on duty at (First St., First Ave.). The parade turned north at (Second St., Third Ave.). The busiest corner is (West St., Third Ave.). To get to the throughway, turn east at (Third St., Third Ave.)

For an intersection, we agree to give the street first and the avenue second.

We could show the plan of the streets this way.


4
3
2
1
West St.
0
1
2
3
4
5
South Ave.
(1,4)
(2,4)
(3,4)
(4,4)
(1,3)
(2,3)
(3,3)
(4,3)
(1,2)
(2,2)
(3,2)
(4,2)
(1,1)
(2,1)
(3,1)
(4,1)
STOP

For an intersection we use a pair of numbers, and we agree:
the first number of the pair tells the street
the second number of the pair tells the avenue.

The traffic light is at the intersection of Fourth Street and First Avenue. We name this intersection (4,1).

What is the intersection where the police officer is on duty?
What is the number pair for this intersection?

IN ACTION

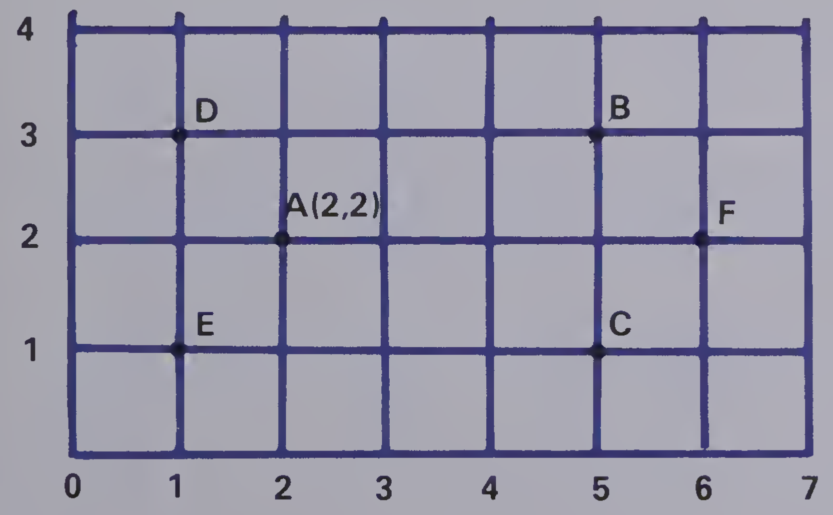
1. What is the intersection where the crossing guard is on duty?
   What is the number pair for this intersection?

2. What is the number pair for each intersection?
   - a) (First St., Fifth Ave.)
   - b) (Eighth St., Third Ave.)
   - c) (Sixth St., Tenth Ave.)
   - d) (9th St., 12th Ave.)
   - e) (7th St., 3rd Ave.)
   - f) (8th St., 10th Ave.)

3. What is the intersection for each number pair?
   - a) (3,1)
   - b) (4,3)
   - c) (1,7)
   - d) (2,2)
   - e) (3,5)
   - f) (4,8)

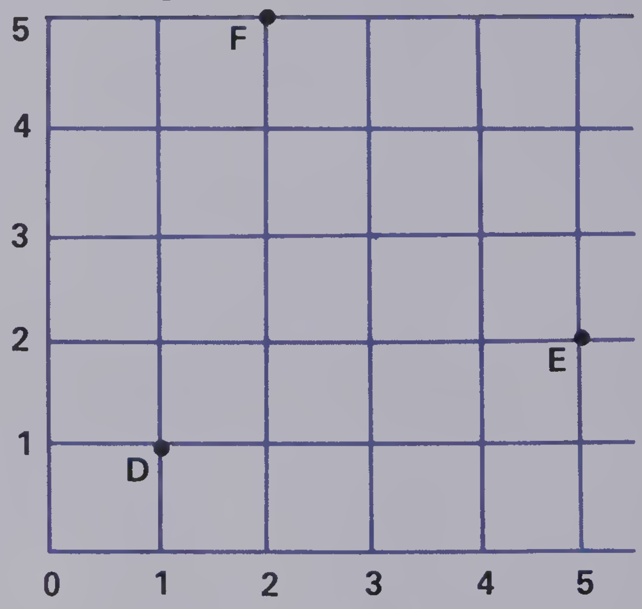
4. Start at (0,0) — (West St., South Ave.) — in each case.
   What is the intersection? What is the number pair?
   - a) Go 3 blocks east then 2 blocks north
   - b) Go 3 blocks east then 4 blocks north
   - c) Go 1 block east then 2 blocks north
   - d) Go 2 blocks east then 2 blocks north

5. What is the number pair for each point named on the map?
   We agree to move to the right first and then up. A ⟶ (2,2)



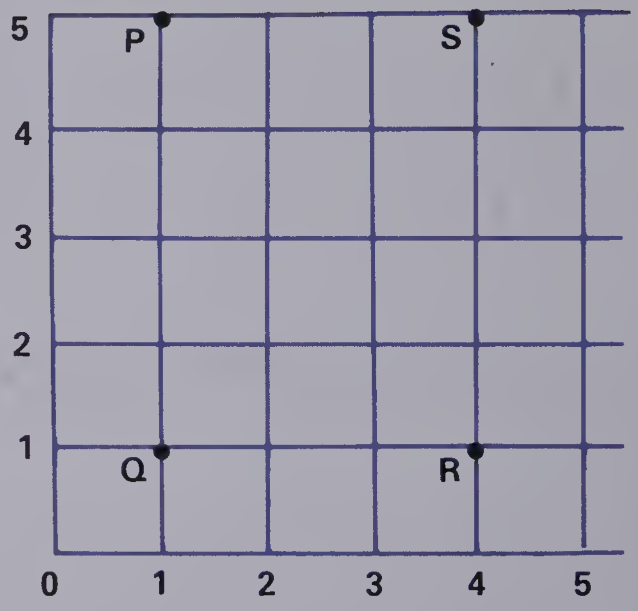
6. Draw a street-avenue map. Start at (0,0) each time. Name the intersection with a capital letter and a number pair.
   - a) (right 3, up 1)
   - b) (right 4, up 2)
   - c) (right 1, up 3)
   - d) (right 2, up 4)
   - e) (3,4)
   - f) (2,1)
   - g) (1,1)
   - h) (3,3)
   - i) (4,5)
   - j) (6,7)

7. Write the ordered pairs that name the positions of points D, E, and F. Think of the line segments DE, EF, and FD. What kind of figure would be formed by the line segments?



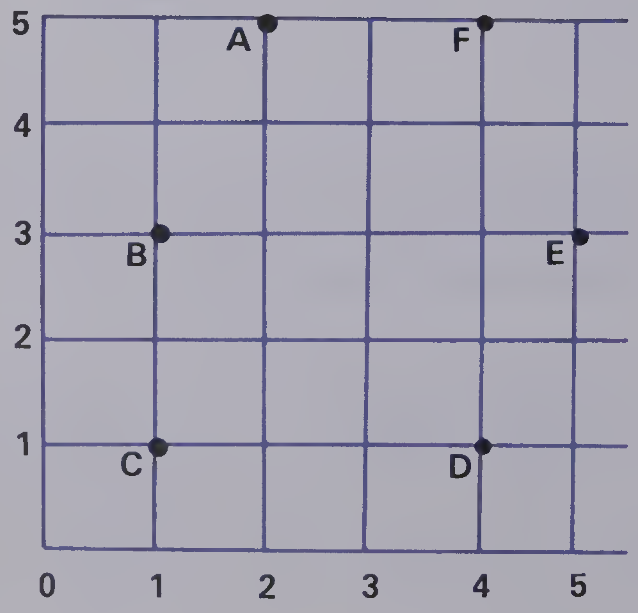
5
4
3
2
1
0
1
2
3
4
5
F
E
D

8. Name the position of each of the points: P,Q,R,S. Think of the line segments from P to Q, from Q to R, from R to S, and from S to P. What kind of figure would be formed by the line segments?



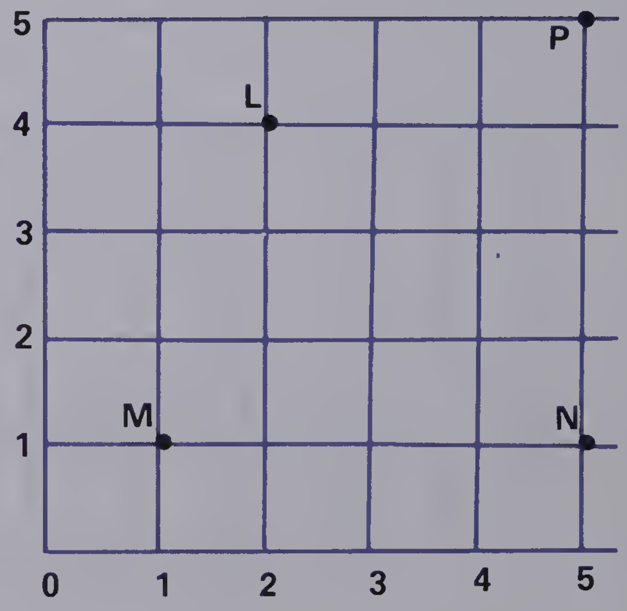
5
4
3
2
1
0
1
2
3
4
5
P
S
Q
R

9. Name the position of each of the points: A,B,C,D,E,F. Think of joining A to B, B to C, C to D, D to E, E to F, and F to A. What kind of figure would be formed?



5
4
3
2
1
0
1
2
3
4
5
A
F
B
E
C
D

10. Name the position of each of the points: L,M,N,P. Think of joining L to M, M to N, N to P, and P to L. What kind of figure would be formed?



5
4
3
2
1
0
1
2
3
4
5
P
L
M
N

EXPLORE

AVERAGE/Meaning of Average

GOALIE OF THE MONTH

In the last 5 games, Gary had an **average** of 2 goals a game scored against him.

Complete to show some possible 5-game records for the goalie.

Game	Goals Against
1	4
2	0
3	1
4	3
5	2
Total	10

Game	Goals Against
1	1
2	1
3	4
4	0
5	?
Total	10

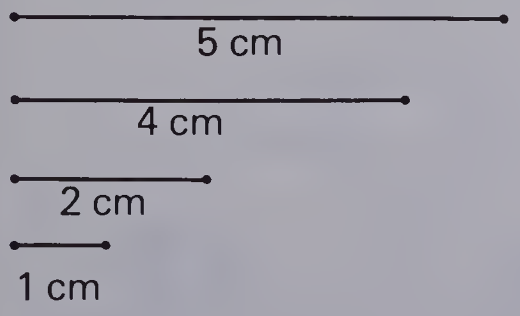
Game	Goals Against
1	2
2	2
3	2
4	2
5	?
Total	10

Game	Goals Against
1	?
2	3
3	0
4	0
5	4
Total	10

Make 2 other possible charts for the goalie's last 5-game record. The total number of goals scored against the goalie was 5×2 or 10. Do you think it would be likely that the number of goals scored against Gary would be exactly 2 per game?

Average Length

What is the average length of the 4 line segments?

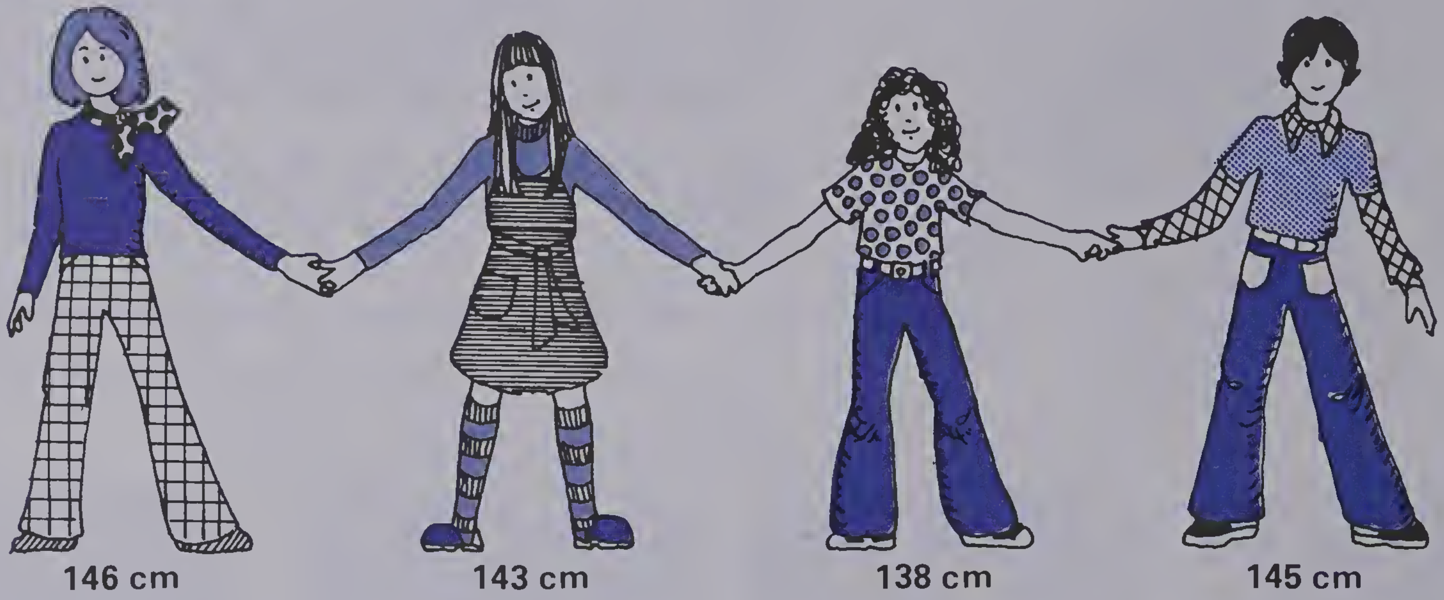


Think

What is the total length?
If the total length were the same
and each line segment had the same length,
what would be this length?

IN ACTION

1. What is the average height of the 4 girls?



$$\text{average height} = \left(\frac{146 + 143 + 138 + 145}{4}\right) \text{cm}$$
$$= \ ? \ \text{cm}$$

2. a) The heights of 5 basketball players are 208 cm, 206 cm, 204 cm, 200 cm, 192 cm. Find the average height.

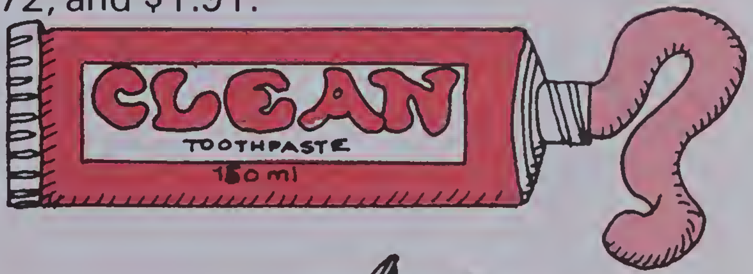
$$\text{average height} = \left(\frac{208 + 206 + 204 + 200 + 192}{5}\right) \text{cm}$$
$$= \ ? \ \text{cm}$$

b) The heights of 5 jockeys are 154 cm, 152 cm, 150 cm, 150 cm, 149 cm. Find the average height.

$$\text{average height} = \left(\frac{? + ? + ? + ? + ?}{5}\right) \text{cm}$$
$$= \ ? \ \text{cm}$$

c) What is the average height of the athletes in parts a) and b)?

3. a) The masses of 3 Great Danes are 54 kg, 60 kg, 63 kg.
   Find the average mass.
   b) The masses of 3 chihuahuas are 1 kg, 2 kg, 3 kg .
   Find the average mass.
   c) Find the average mass of the 6 dogs.
   Which of the averages is most useful?



4. The prices of the large size (150 ml) of 4 different brands of toothpaste are $1.88, $2.05, $1.72, and $1.91.
   What is the highest price?
   What is the lowest price?
   What is the average price?
   Why can the average price be helpful for the buyer?

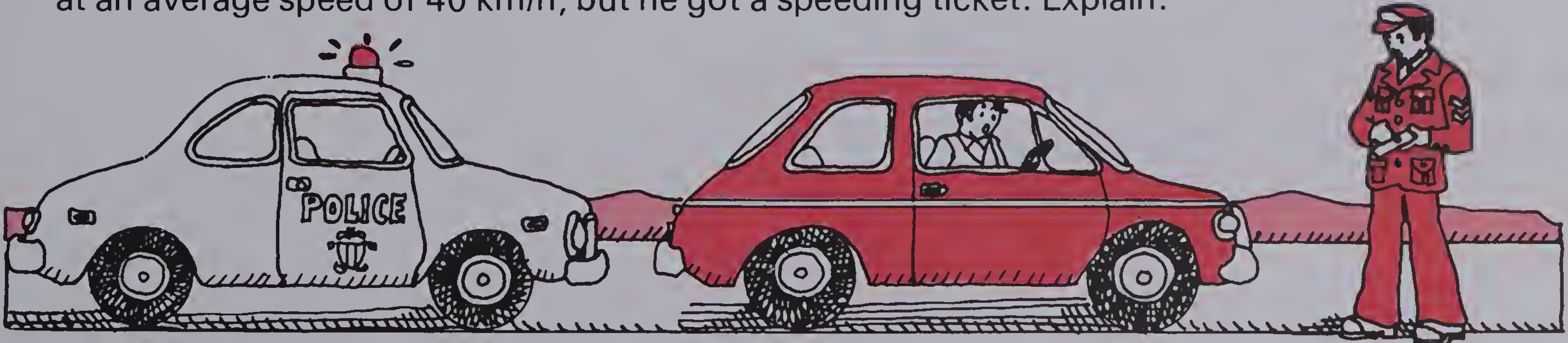
5. The motorist drove 60 km in the first hour, 70 km in the second hour, 55 km in the third hour, and 80 km in the fourth hour.
   What is the average distance travelled in 1 h?

6. Brock took the temperature each hour during the morning.
   Here are the readings.

09:00	14°C
10:00	15°C
11:00	17°C
12:00	18°C

   What is the average of the 4 readings?

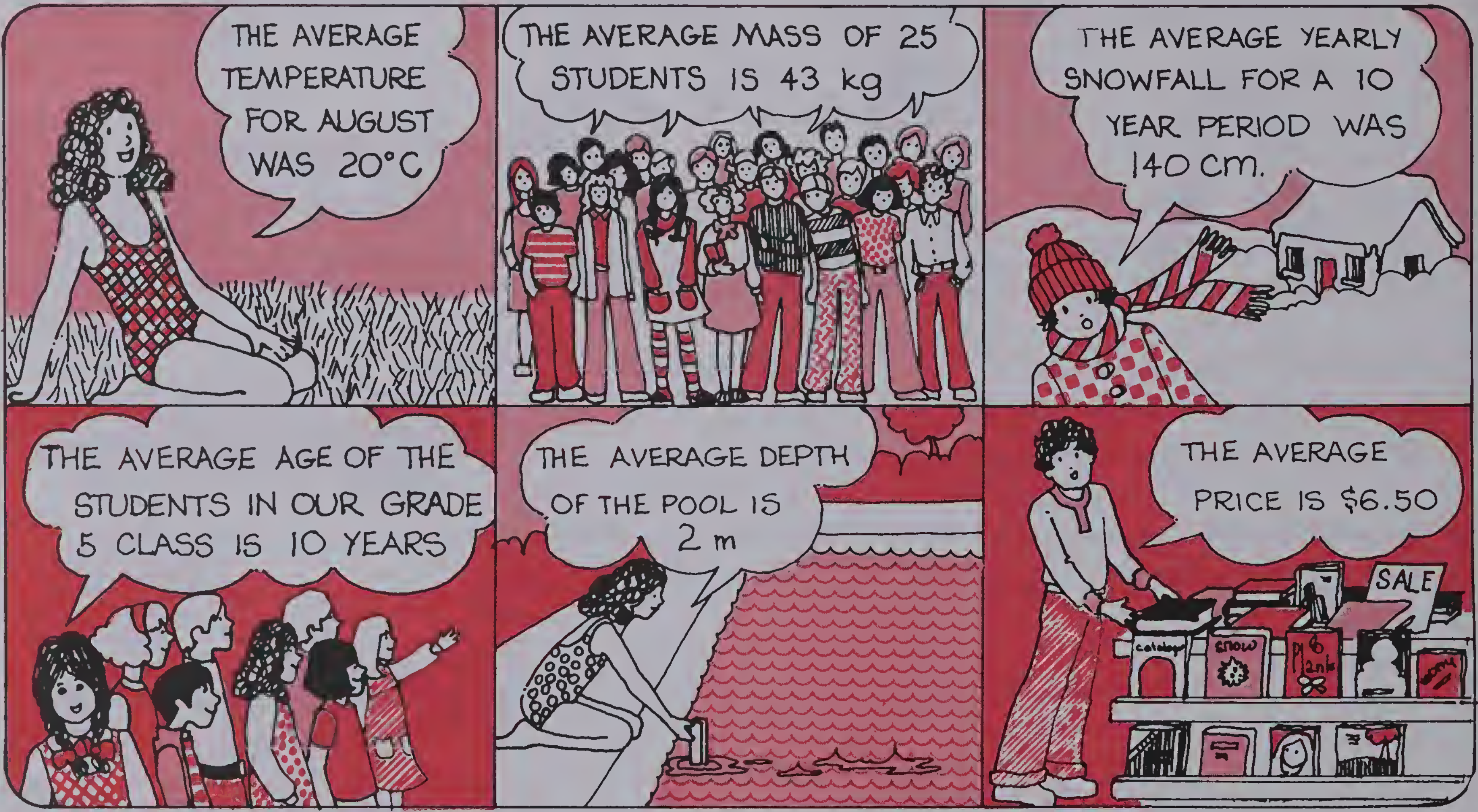
7. A motorist drove through the 50 km/h (50 kilometres per hour) zone at an average speed of 40 km/h, but he got a speeding ticket. Explain.



Average Condition/Average

IN ACTION

1. Find the average of
   - a) 8,7,15,14
   - b) 1,2,3,4,5
   - c) 2,4,6,8,10,12
   - d) 0,3,6,9,12,15,18
   - e) 10,20,30,40,50


THE AVERAGE TEMPERATURE FOR AUGUST WAS 20°C
THE AVERAGE MASS OF 25 STUDENTS IS 43 kg
THE AVERAGE YEARLY SNOWFALL FOR A 10 YEAR PERIOD WAS 140 cm.
THE AVERAGE AGE OF THE STUDENTS IN OUR GRADE 5 CLASS IS 10 YEARS
THE AVERAGE DEPTH OF THE POOL IS 2 m
THE AVERAGE PRICE IS $6.50
SALE
catalogue
snow

We speak of **average conditions,** but an **average** is really a number.

To find an average of a set of numbers, we

a) find the sum

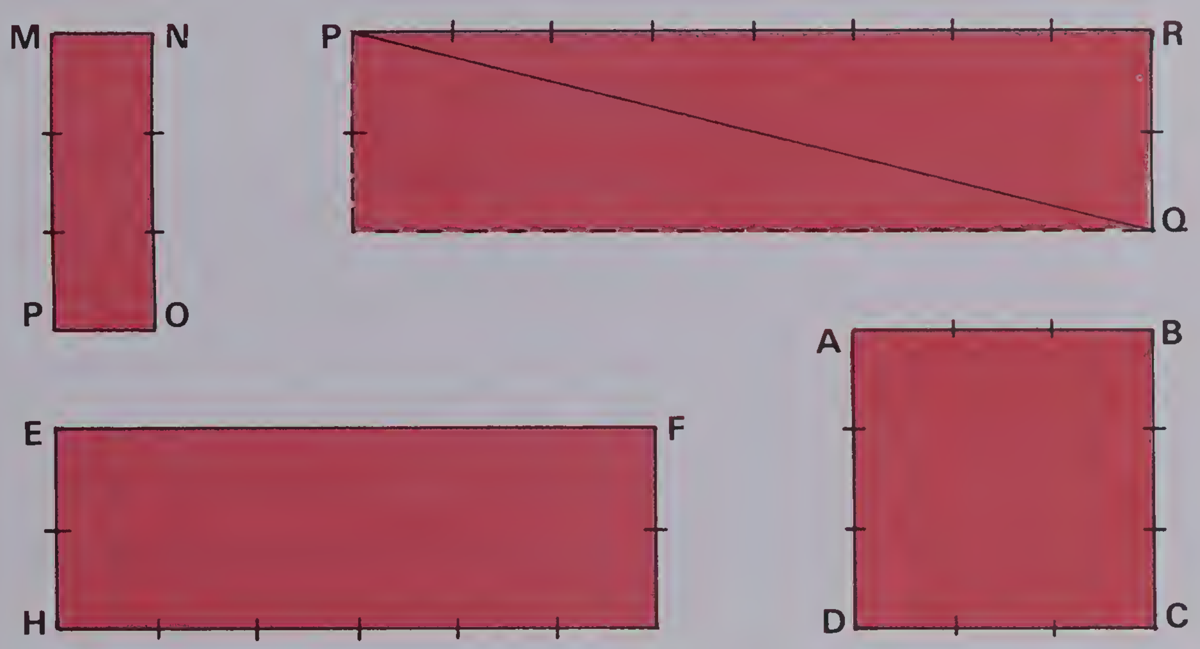
b) divide the sum by the number of numbers in the set

Find the average of 6,8,7,12,18,3.

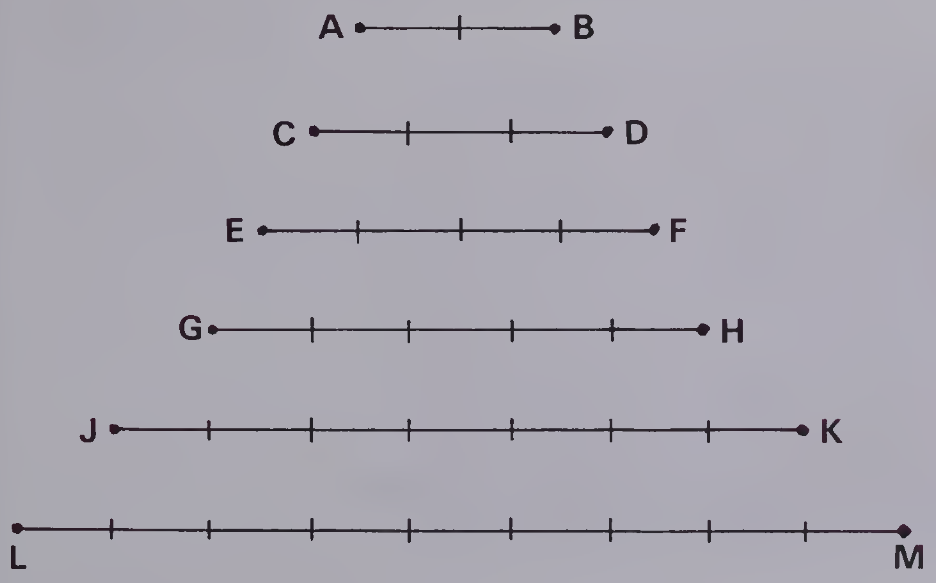
$$\text{average} = \frac{6 + 8 + 7 + 12 + 18 + 3}{6}$$

$$= 9$$

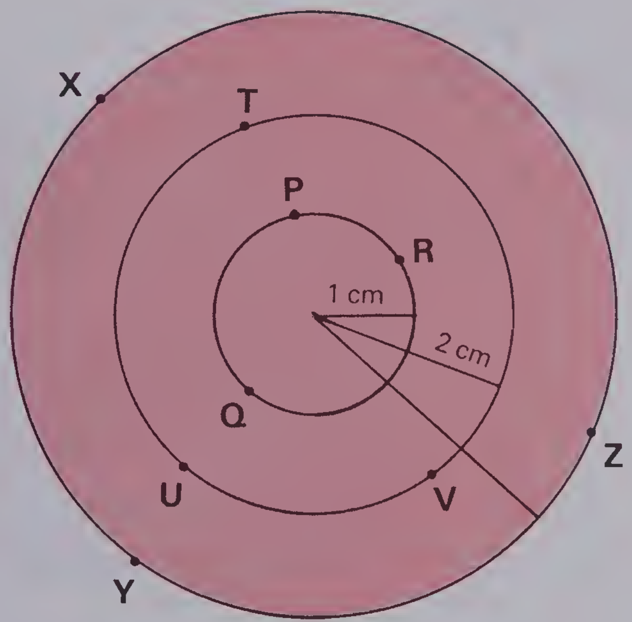
2. Which one has the average area?


M
N
P
O
P
R
Q
A
B
E
F
H
D
C

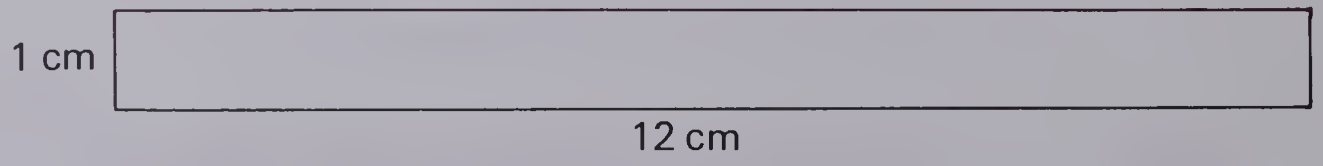
3. Which one is the average line segment?


A
B
C
D
E
F
G
H
J
K
L
M

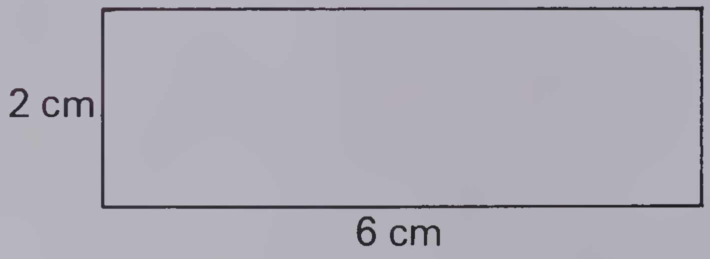
4. Which one is the average circle by radius?


X
T
P
R
1 cm
2 cm
Q
U
V
Z
Y

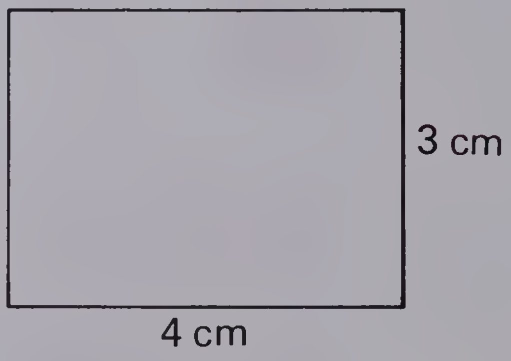
FACTORS



$$\underset{\text{factor}}{1} \times \underset{\text{factor}}{12} = \underset{\text{product}}{12}$$



$2 \times 6 = 12$



$3 \times 4 = 12$

Each rectangle illustrates 12.
1,2,3,4,6,12 are **factors** of 12.
We sometimes say,
the set of factors of 12 = {1,2,3,4,6,12}

IN ACTION

1. Draw rectangles to illustrate each number. List the set of factors for each.
   a) 10 b) 15 c) 20 d) 3 e) 5 f) 13

2. Use rectangles and squares to illustrate each number.
   a) 4 b) 9 c) 16 d) 25

   How many rectangles can you draw for each number?
   How many squares can you draw for each number?

   List the set of factors for each number.
   How many factors has each number?

Finding Factors of a Number

You can find the set of factors of a number this way.
Find the set of factors of 60.
1 and the number itself are factors of any number.

Is 60 divisible by *k*?

k	Check	Factors
1	1 × 60 = 60	1 60
2	2 × 30 = 60	2 30
3	3 × 20 = 60	3 20
4	4 × 15 = 60	4 15
5	5 × 12 = 60	5 12
6	6 × 10 = 60	6, 10

The set of factors of 60 is {1,2,3,4,5,6,10,12,15,20,30,60}

IN ACTION

1. Complete the chart to find the factors of 80.
   Is 80 divisible by *k*?

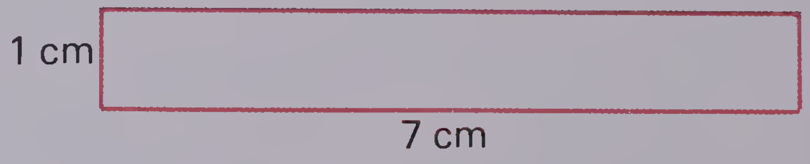
Number *k*	Yes	No	Factors
1	✓		1, 80
2	✓		2, ?
3		✗	
4			
5			
6			
7			
8			

2. List the set of factors of
   a) 18 b) 22 c) 28 d) 40 e) 36 f) 90

Composite Numbers/Prime Numbers

How many rectangles can you draw to illustrate 12?
How many factors has 12?
A number such as 12 that has more than 2 factors
is called a **composite number.**

How many rectangles can you draw to show 7?



$1 \times 7 = 7$

1,7 are the only factors of 7.

A number such as 7 that has only 2 factors is called a **prime number.**

1 is a special number.

Every whole number can be generated by starting with 0,
the first whole number, and continuing to add 1:
$0, \quad 0 + 1, \quad 1 + 1, \quad 2 + 1, \quad 3 + 1, \quad \ldots$

Any number multiplied by 1 is the number itself.
$0 \times 1 = 0, \quad 1 \times 1 = 1, \quad 2 \times 1 = 2, \quad 3 \times 1 = 3, \quad \ldots$

1 has only 1 factor.

It is neither composite nor prime.

Finding Prime Numbers

Find the prime numbers between 1 and 21.
Since 1 is neither prime nor composite, begin with 2.
Making a list will help.

2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20

Number	Think	No. of factors	Prime Numbers	Composite Numbers
2	2 is divisible by only 2	2 {1,2}	2	
4,6,8, 10,12, 14,16, 18,20	each is even 2 is a factor	more than 2 factors (at least 1,2, and the number itself)		4,6,8,10,12,14 16,18,20

Now we have
3, 5, 7, 9, 11, 13, 15, 17, 19 left

3	3 is divisible by only 3	2 {1,3}	3	
9,15	are multiples of 3 (3 is a factor)	more than 2 factors		9,15

IN ACTION

Continue this way to find the prime numbers between 1 and 21.
Note that 2 is the only even prime number.

Prime Numbers

TABLE OF PRIME NUMBERS

	13	37	61	89	127
$\boxed{2}$	17	41	67	101	131
3	19	43	71	103	137
5	23	47	73	107	139
7	29	53	79	109	149
11	31	59	83	113	151

ADDITION OF PRIME NUMBERS

We can express even numbers as the sum of 2 odd prime numbers.

$$\underset{\text{even}}{8} = \underbrace{5 \quad + \quad 3}_{\text{odd, prime}}$$

Find the pairs of odd primes that have a sum equal to the even numbers from 8 to 50. Write your number sentences in a table.

SUBTRACTION OF PRIME NUMBERS

We can express even numbers as the difference of 2 odd prime numbers.

$$\underset{\text{even}}{2} = \underbrace{5 \quad - \quad 3}_{\text{odd, prime}}$$

Find the pairs of odd primes that have a difference equal to the even numbers from 2 to 50.

Prime Number Pathway
Add columns, rows, and diagonals. Draw a line through the pathway that has the greatest sum.

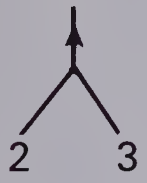
Make a pathway puzzle of your own. Give it to a friend to solve.

11	7	7	3
3	5	11	7
7	11	13	7
7	7	5	3

Tree Diagrams

We can use prime numbers as factors on the tree diagram and generate composite numbers.
In each case, let *c* represent a composite number.
Generate *c* by using as factors some of the first 5 prime numbers, {2,3,5,7,11}.

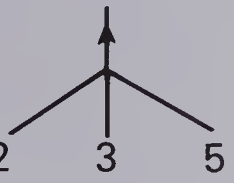
$c = ?$



$2 \times 3 = 6$

$c = 6$

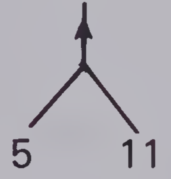
$c = ?$



$c = 2 \times 3 \times 5$

$c = ?$

$c = ?$



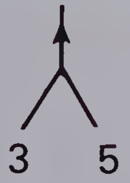
$c = 5 \times 11$

$c = ?$

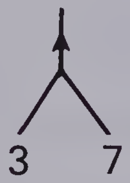
IN ACTION

1. What is the composite number, *c*?

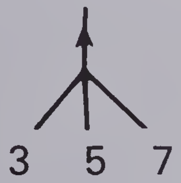
a) $c = ?$



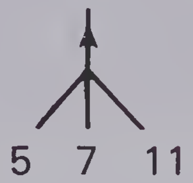
b) $c = ?$



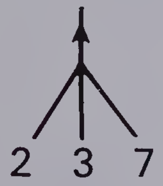
c) $c = ?$



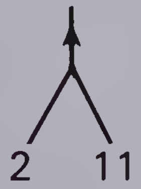
d) $c = ?$



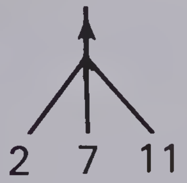
e) $c = ?$



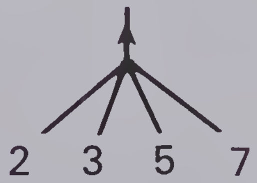
f) $c = ?$



g) $c = ?$



h) $c = ?$

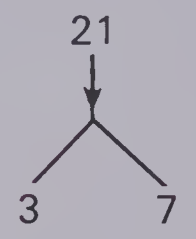


2. How do you generate an even composite number using prime numbers?

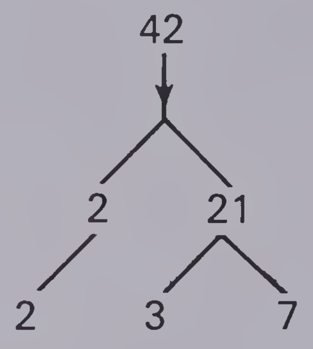
3. What factors will generate a prime number?
Illustrate, by tree diagrams, how to generate 7, 11, and 13.

Finding Prime Factors of a Number

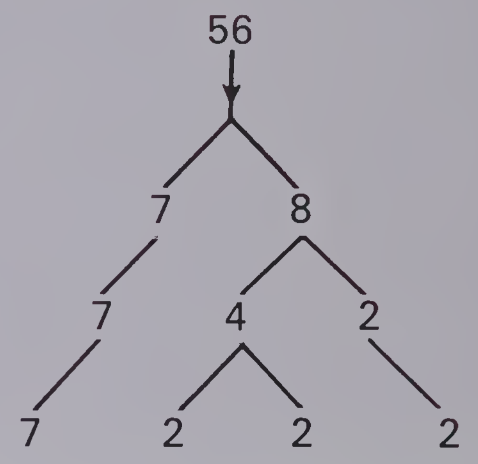
If we start with a composite number,
we can use a tree diagram to help branch to its prime factors.



$21 = 3 \times 7$

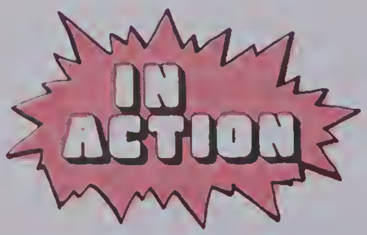


$42 = 2 \times 3 \times 7$

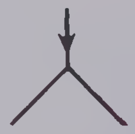


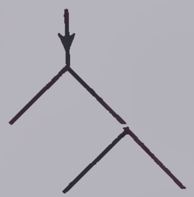
$56 = 7 \times 2 \times 2 \times 2$

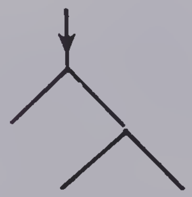
Each composite number
is expressed as a product of its prime factors.

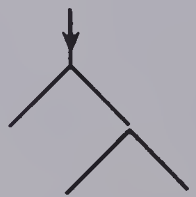


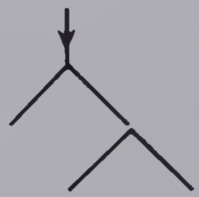
1. Complete each tree diagram
to help you express the composite number
as a product of its prime factors.

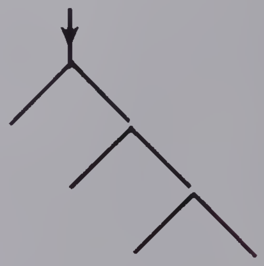
a) 35


b) 18


c) 45


d) 63


e) 30


f) 210


2. Express each number as a product of its prime factors.
Use tree diagrams to help you.

a) 63 b) 28 c) 81 d) 75 e) 105 f) 49
g) 147 h) 144 i) 150 j) 100 k) 175 l) 225

Further Practice/Unit 1 Place Value, Addition and Subtraction

1. Write the meaning form.

a) 3468 b) 8046 c) 1507 d) 4007 e) 9000 f) 123.5
g) 58.46 h) 304.81 i) 463.2 j) 94.07 k) 170.07 l) 800.05

2. Write the value of each coloured digit.

a) 546**3** b) 8**7**24 c) 50**4**7 d) **9**360 e) 153.**4**1 f) 87.4**2**
g) 15**6**.43 h) 87.4**7** i) **9**26.18 j) 346.**0**2 k) **9**.46 l) **0**.87

3. Use < or > or = to complete each sentence.

a) 34 ? 34.1 b) 64 ? 62 c) 4.1 ? 4.1 d) 156 ? 15.6
e) 1400 ? 1403 f) 17.6 ? 1.76 g) 724.2 ? 724.3 h) 53.2 ? 53.02
i) 100.01 ? 10.01 j) 10.1 ? 10.01 k) 2.4 ? 0.24 l) 371.15 ? 371.15

4. Add 1 to each number.

a) 37 b) 146 c) 3027 d) 9639 e) 12.7 f) 5.46
g) 77.7 h) 20.8 i) 5400.1 j) 8703.21 k) 0.1 l) 0.01

5. Subtract 1 from each number.

a) 27 b) 541 c) 6037 d) 9620 e) 34.6 f) 7.13
g) 80.5 h) 106.5 i) 3.57 j) 6041.35 k) 1.1 l) 11.01

6. Write the greatest number. Use all the digits.

a) 4,5,1,4 b) 6,4,1,9 c) 8,3,9,7 d) 4,0,2,7 e) 7,0,1,0

7. Write the least number. Use all the digits.

a) 5,7,1,6 b) 3,8,5,2 c) 4,6,9,1 d) 0,6,3,9 e) 8,0,1,0

8. Write the sum for each number pair.

a) (8,3) b) (9,7) c) (5,9) d) (7,6) e) (8,7) f) (6,9) g) (8,9)
h) (15,9) i) (36,9) j) (51,9) k) (27,6) l) (83,8) m) (65,8) n) (97,7)

9. Write the difference for each number pair.

a) (7,5) b) (8,3) c) (9,4) d) (10,6) e) (24,6) f) (32,8) g) (45,8)
h) (72,5) i) (94,8) j) (37,9) k) (73,6) l) (62,9) m) (94,9) n) (55,7)

Addition and Subtraction/Decimals

10. Add.

a) 28 14 43 89	b) 68 17 34 81	c) 49 83 20 17	d) 56 42 80 71	e) 146 308 825 651	f) 287 649 358 720	g) 909 187 649 532
h) $64.32 14.68	i) $51.36 68.91	j) $94.06 33.94	k) $72.38 49.92	l) $134.62 296.53	m) $361.43 821.67	
n) 46.5 3.8 6.2	o) 36.8 90.7 138.5	p) 64.83 1.32 7.56	q) 136.4 831.6 904.0	r) 3.86 45.73 390.57	s) 7.63 80.06 140.80	

11. Subtract.

a) 6439 2136	b) 7247 3186	c) 9361 5198	d) 4953 1260	e) 5864 4037	f) 6091 2347
g) $48.61 39.09	h) $24.63 21.96	i) $96.04 52.36	j) $75.40 8.95	k) $148.00 62.48	l) $560.00 38.43
m) 146.3 6.8	n) 46.38 10.46	o) 130.4 63.7	p) 19.00 6.75	q) 47.01 36.07	r) 136.42 18.69

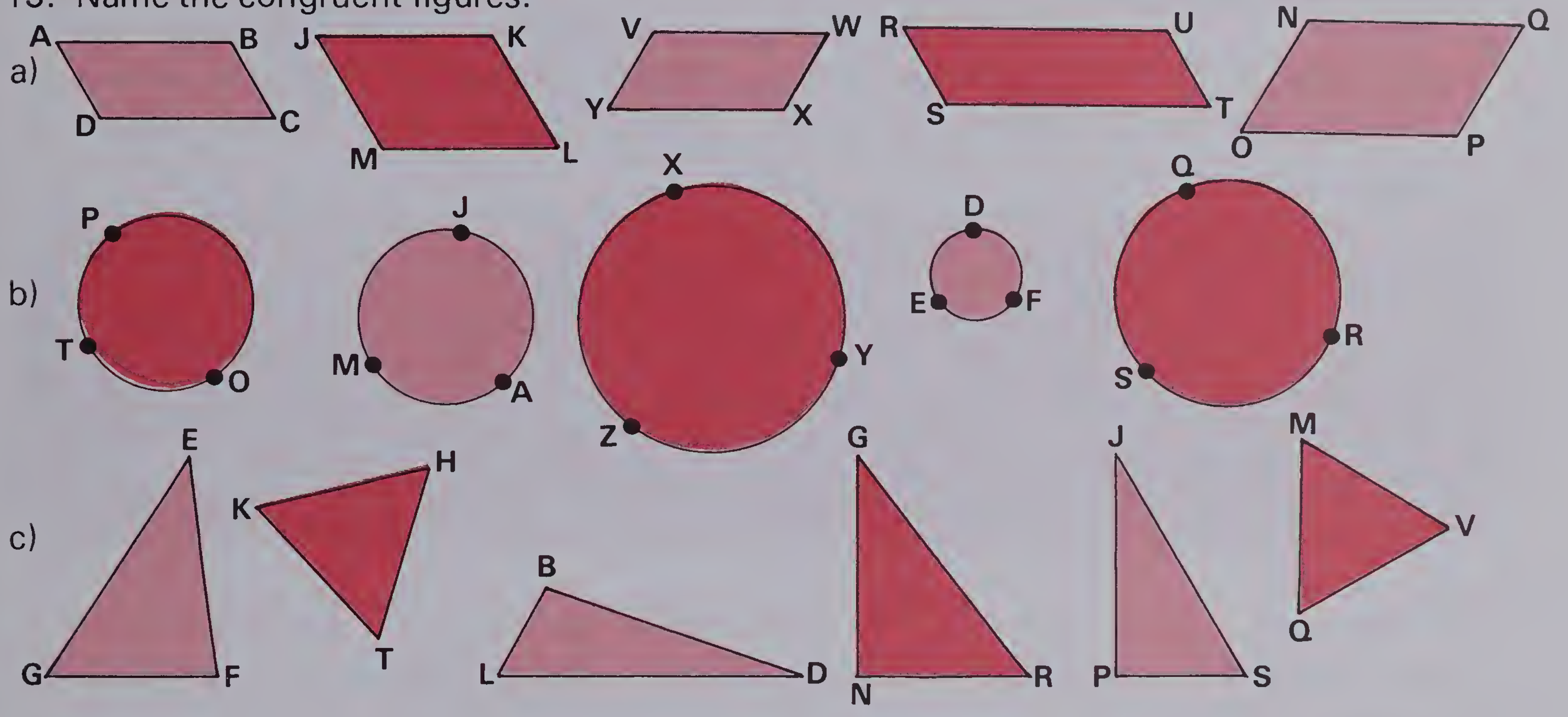
12. Price list for hockey equipment

hockey stick	$6.95
helmet	$8.50
gloves	$19.40
shoulder pads	$14.97
elbow pads	$4.70
shin pads	$5.87

a) What is the total cost of the equipment for 1 player?
b) What is the change from $100?
c) A cheaper hockey stick costs $5.98. How much would you save if you bought the cheaper one?
d) A player used 4 of the expensive sticks in 1 year. What is the cost?
e) How much would 4 of the cheaper sticks cost?
f) How much would the player save if he used 4 of the cheaper sticks?

Congruence, Multiplication and Division/Decimals

13. Name the congruent figures.



14. a) Draw and name a pentagon.
    b) Draw and name a triangle.
    c) Draw and name a quadrilateral.
    d) Draw and name a parallelogram.

15. Solve.

a) $r = 1 \times 0.4$	b) $m = 1.4 \times 10$	c) $v = 100 \times 23.4$	d) $k = 13.42 \times 10$
e) $f = 1 \times 4.32$	f) $c = 0.9 \times 10$	g) $q = 100 \times 0.07$	h) $d = 6.03 \times 100$
i) $e = 14.08 \times 10$	j) $a = 1 \times 0.01$	k) $h = 24 \div 1$	l) $p = 38 \div 10$
m) $w = 543 \div 100$	n) $d = 3.8 \div 1$	o) $w = 16.4 \div 10$	p) $51.9 \div k = 5.19$
q) $32.7 \div n = 3.27$	r) $14.1 \div v = 14.1$	s) $0.3 \div l = 0.03$	t) $3 \div j = 0.03$

16. Multiply.

a) $\begin{array}{r}29\\ \underline{6}\end{array}$ b) $\begin{array}{r}314\\ \underline{8}\end{array}$ c) $\begin{array}{r}921\\ \underline{5}\end{array}$ d) $\begin{array}{r}380\\ \underline{4}\end{array}$ e) $\begin{array}{r}602\\ \underline{9}\end{array}$ f) $\begin{array}{r}475\\ \underline{7}\end{array}$ g) $\begin{array}{r}900\\ \underline{8}\end{array}$

h) $\begin{array}{r}4.3\\ \underline{6}\end{array}$ i) $\begin{array}{r}52.4\\ \underline{3}\end{array}$ j) $\begin{array}{r}36.0\\ \underline{5}\end{array}$ k) $\begin{array}{r}90.7\\ \underline{7}\end{array}$ l) $\begin{array}{r}67.5\\ \underline{9}\end{array}$ m) $\begin{array}{r}40.7\\ \underline{8}\end{array}$ n) $\begin{array}{r}60.0\\ \underline{4}\end{array}$

Multiplication and Equivalent Fractions

17. Complete these patterns.

a) $18 \times 10 = ?$
$18 \times 100 = ?$
$18 \times 1000 = ?$

b) $5123 \div 10 = ?$
$5123 \div 100 = ?$
$5123 \div 1000 = ?$

c) $48.9 \times 10 = ?$
$48.9 \times 100 = ?$
$48.9 \times 1000 = ?$

d) $3634 \div 10 = ?$
$3634 \div 100 = ?$
$3634 \div 1000 = ?$

18. Complete the chart.

	n	$3 \times n$	$3 \times n + 1$	$5 \times n$	$9 \times n \div 3$	$4 \times n - 1$
a)	1		4		3	
b)	4					
c)			34	55		
d)		30		50		
e)						11
f)				30		

19. Solve.

a) $r = 39 \times 7$
b) $n = 4.6 \times 3$
c) $e = 781 \times 8$
d) $v = 58.7 \times 2$
e) $k = 704 \times 6$
f) $m = 50.4 \times 4$
g) $p = 370 \times 9$
h) $q = 19.0 \times 5$
i) $l = 297 \times 6$
j) $d = 46.7 \times 8$

20. Complete the chart.

	1st Measurement	Operation	2nd Measurement	Operation	3rd Measurement
a)	150 cm	150 ÷ 100	? m	?	150 cm
b)	40 m	40 × 100	? km	? ÷ 100	? m
c)	4 km	?	4000 m	4000 ÷ 100	? m
d)	5000 mm	?	500 cm	?	5 m
e)	685 cm	685 ÷ 100	?	? × 100	?

21. Arrange the following lengths in order from least to greatest.

a) 632 cm, 6.4 m, 6000 mm
b) 2000 mm, 2000 m, 20 cm
c) 206 cm, 2460 mm, 2.5 m
d) 1 m, 872 mm, 6.5 cm, 87 cm

22. Complete.

a) $\frac{3}{2} = 1\frac{?}{2}$
b) $\frac{6}{5} = 1\frac{?}{5}$
c) $\frac{8}{4} = ?$
d) $\frac{13}{10} = ?$
e) $\frac{21}{10} = ?$
f) $\frac{16}{5} = ?$
g) $\frac{12}{4} = ?$
h) $\frac{9}{2} = ?$
i) $\frac{7}{4} = ?$
j) $\frac{109}{100} = ?$
k) $\frac{43}{10} = ?$
l) $\frac{200}{100} = ?$
m) $\frac{8}{5} = ?$
n) $\frac{20}{2} = ?$
o) $\frac{57}{10} = ?$
p) $\frac{150}{100} = ?$
q) $\frac{45}{5} = ?$
r) $\frac{22}{4} = ?$

Fractions and Perimeter

23. Write the equivalent fraction.

a) $\frac{1}{2}=\frac{?}{4}$ b) $\frac{1}{2}=\frac{?}{10}$ c) $\frac{1}{2}=\frac{?}{100}$ d) $\frac{1}{5}=\frac{?}{20}$ e) $\frac{1}{5}=\frac{?}{50}$ f) $\frac{1}{5}=\frac{?}{100}$

g) $\frac{3}{2}=\frac{?}{4}$ h) $\frac{3}{2}=\frac{?}{10}$ i) $\frac{3}{2}=\frac{?}{100}$ j) $\frac{4}{5}=\frac{?}{20}$ k) $\frac{4}{5}=\frac{?}{50}$ l) $\frac{4}{5}=\frac{?}{100}$

m) $\frac{3}{5}=\frac{?}{10}$ n) $\frac{2}{4}=\frac{?}{2}$ o) $\frac{6}{10}=\frac{?}{5}$ p) $\frac{10}{100}=\frac{?}{10}$ q) $\frac{10}{10}=\frac{?}{4}$ r) $\frac{75}{100}=\frac{?}{4}$

24. Solve.

a) $r=\frac{1}{2}+\frac{2}{2}$ b) $c=\frac{2}{5}+\frac{3}{5}$ c) $k=\frac{3}{4}+\frac{3}{4}$ d) $a=\frac{4}{10}+\frac{6}{10}$

e) $p=\frac{80}{100}+\frac{20}{100}$ f) $h=\frac{6}{5}+\frac{1}{5}$ g) $e=\frac{1}{4}+\frac{9}{4}$ h) $q=\frac{3}{2}+\frac{1}{2}$

i) $f=\frac{8}{10}+\frac{3}{10}$ j) $n=\frac{15}{100}+\frac{35}{100}$ k) $g=\frac{6}{5}+\frac{2}{5}$ l) $d=\frac{1}{4}+\frac{1}{4}+\frac{1}{2}$

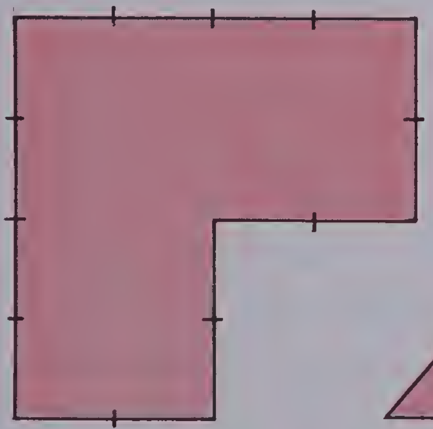
25. Subtract.

a) $\frac{3}{4}-\frac{1}{4}$ b) $\frac{4}{5}-\frac{1}{5}$ c) $\frac{6}{10}-\frac{4}{10}$ d) $\frac{3}{2}-\frac{1}{2}$ e) $\frac{7}{5}-\frac{2}{5}$

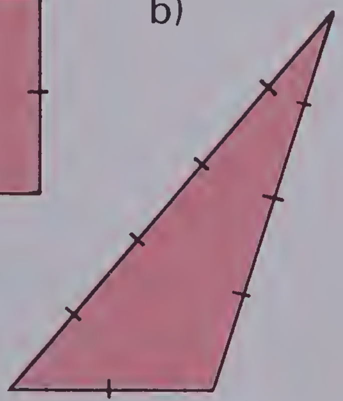
f) $\frac{15}{10}-\frac{8}{10}$ g) $\frac{10}{2}-\frac{8}{2}$ h) $\frac{16}{100}-\frac{6}{100}$ i) $\frac{9}{5}-\frac{8}{5}$ j) $\frac{30}{100}-\frac{20}{100}$

26. Find the perimeter in centimetres.

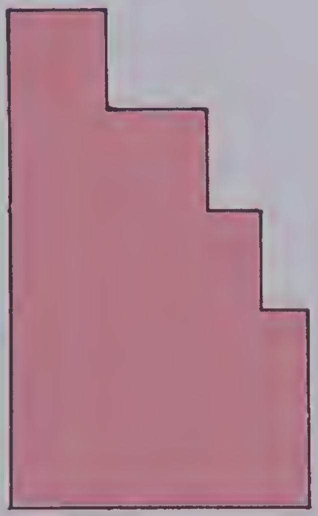
a)



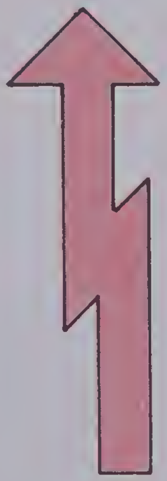
b)



c)



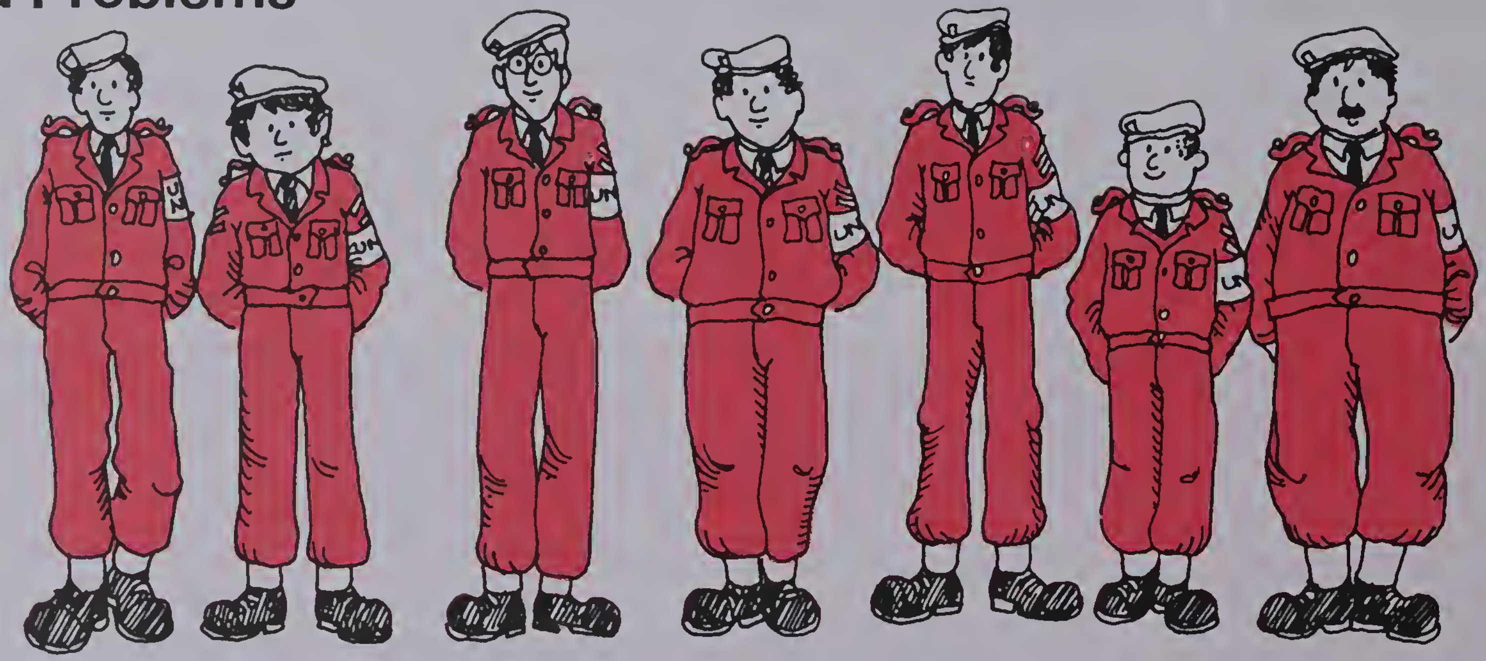
d)



27. Find the perimeter of
   a) a rectangular piece of wood measuring 130 cm by 10 cm
   b) a triangle measuring 8 cm by 13 cm by 19 cm
   c) a square with sides of 100 mm

28. The perimeter of a regular pentagon is 60 cm. What is the length of each side?

Word Problems



29. The following numbers of Canadian soldiers helped in world peace keeping operations:
Gaza Strip 900; Congo 300;
Middle East 1100; Cyprus 580.
What was the total number of men involved?

30. What is the time difference in hours between the following cities when it is:
    a) 19:00 in Athens and 24:00 in Djakarta
    b) 12:00 in Lima and 01:00 in Peking
    c) 18:00 in Amsterdam and 05:00 in Auckland?

31. If there are 365 d in a year and 7 d in a week, will the days divide into an equal number of weeks?

32. Sir John A. Macdonald was Prime Minister of Canada from 1867 to 1873 and from 1878 to 1891. How many years was he Prime Minister?

33. At 20°N latitude, Venus will rise at 03:36 and set at 14:47. How many hours and minutes is Venus visible?

34. At 40°N latitude, Venus will rise at 04:11. What is the time difference between the rise of Venus at 20° and 40°N latitude?

35. Galileo invented the first thermometer in 1593. Fahrenheit invented the first mercury thermometer in 1714. How many years after the first thermometer did Fahrenheit make his discovery?

36. The average wind speed at Churchill, Man. is approximately twice that of Vancouver, B.C. If the average wind speed at Vancouver is 12.3 km/h, what is the wind speed of Churchill?

37. Georges Vanier was Governor General of Canada from 1959 to 1967. How many years was he Governor General?

38. Vancouver airport handles approximately 540 flights a day. How many flights take place a) in 1 week b) in 10 weeks?

Answers to Further Practice/Unit 1

1. a) 3 thousands, 4 hundreds, 6 tens, and 8 ones b) 8 thousands, 4 tens, and 6 ones
c) 1 thousand, 5 hundreds, and 7 ones d) 4 thousands and 7 ones
e) 9 thousands f) 1 hundred, 2 tens, 3 ones, and 5 tenths
g) 5 tens, 8 ones, 4 tenths, and 6 hundredths h) 3 hundreds, 4 ones, 8 tenths, and 1 hundredth
i) 4 hundreds, 6 tens, 3 ones, and 2 tenths j) 9 tens, 4 ones, and 7 hundredths
k) 1 hundred, 7 tens, and 7 hundredths l) 8 hundreds and 5 hundredths

2. a) 3 ones b) 7 hundreds c) 4 tens d) 9 thousands e) 4 tenths f) 2 hundredths
g) 6 ones h) 7 hundredths i) 9 hundreds j) 0 tenths k) 9 ones l) 0 ones

3. a) < b) > c) = d) > e) < f) > g) < h) > i) > j) > k) > l) =

4. a) 38 b) 147 c) 3028 d) 9640 e) 13.7 f) 6.46
g) 78.7 h) 21.8 i) 5401.1 j) 8704.21 k) 1.1 l) 1.01

5. a) 26 b) 540 c) 6036 d) 9619 e) 33.6 f) 6.13
g) 79.5 h) 105.5 i) 2.57 j) 6040.35 k) 0.1 l) 10.01

6. a) 5441 b) 9641 c) 9873 d) 7420 e) 7100

7. a) 1567 b) 2358 c) 1469 d) 0369 e) 0018

8. a) 11 b) 16 c) 14 d) 13 e) 15 f) 15 g) 17
h) 24 i) 45 j) 60 k) 33 l) 91 m) 73 n) 104

9. a) 2 b) 5 c) 5 d) 4 e) 18 f) 24 g) 37
h) 67 i) 86 j) 28 k) 67 l) 53 m) 85 n) 48

10. a) 174 b) 200 c) 169 d) 249 e) 1930 f) 2014
g) 2277 h) $79.00 i) $120.27 j) $128.00 k) $122.30 l) $431.15
m) $1183.10 n) 56.5 o) 266.0 p) 73.71 q) 1872.0 r) 440.16
s) 228.49

11. a) 4303 b) 4061 c) 4163 d) 3693 e) 1827 f) 3744
g) $9.52 h) $2.67 i) $43.68 j) $66.45 k) $85.52 l) $521.57
m) 139.5 n) 35.92 o) 66.7 p) 12.25 q) 10.94 r) 117.73

12. a) $60.39 b) $39.61 c) $0.97 d) $27.80 e) $23.92 f) $3.88

13. a) ABCD is congruent to VWXY b) JAM is congruent to POT c) KHT is congruent to MVQ

14. Answers will vary.

15. a) $r = 0.4$ b) $m = 14$ c) $v = 2340$ d) $k = 134.2$ e) $f = 4.32$ f) $c = 9$
g) $q = 7$ h) $d = 603$ i) $e = 140.8$ j) $a = 0.01$ k) $h = 24$ l) $p = 3.8$
m) $w = 5.43$ n) $d = 3.8$ o) $w = 1.64$ p) $k = 10$ q) $n = 10$ r) $v = 1$
s) $l = 10$ t) $j = 100$

16. a) 174 b) 2512 c) 4605 d) 1520 e) 5418 f) 3325 g) 7200
h) 25.8 i) 157.2 j) 180.0 k) 634.9 l) 607.5 m) 325.6 n) 240.0

17. a) 180, 1800, 18 000 b) 512.3, 51.23, 5.123 c) 489, 4890, 48 900 d) 363.4, 36.34, 3.634

18.

	n	$3 \times n$	$3 \times n + 1$	$5 \times n$	$9 \times n \div 3$	$4 \times n - 1$
a)	1	3	4	5	3	3
b)	4	12	13	20	12	15
c)	11	33	34	55	33	43
d)	10	30	31	50	30	39
e)	3	9	10	15	9	11
f)	6	18	19	30	18	23

19. a) $r = 273$ b) $n = 13.8$
c) $e = 6248$ d) $v = 117.4$
e) $k = 4224$ f) $m = 201.6$
g) $p = 3330$ h) $q = 95.0$
i) $l = 1782$ j) $d = 373.6$

20.

	1st Measurement	Operation	2nd Measurement	Operation	3rd Measurement
a)	150 cm	÷ 100	1.5 m	× 100	150 cm
b)	40 m	× 100	4 km	÷ 100	40 m
c)	4 km	× 1000	4000 m	÷ 100	40 m
d)	5000 mm	÷ 10	500 cm	÷ 100	5 m
e)	685 cm	÷ 100	6.85 m	× 100	685 cm

21. a) 6000 mm, 632 cm, 6.4 m
b) 20 cm, 2000 mm, 2000 m
c) 206 cm, 2460 mm, 2.5 m
d) 6.5 cm, 87 cm, 872 mm, 1 m

22. a) $1\frac{1}{2}$ b) $1\frac{1}{5}$ c) 2 d) $1\frac{3}{10}$ e) $2\frac{1}{10}$ f) $3\frac{1}{5}$ g) 3 h) $4\frac{1}{2}$ i) $1\frac{3}{4}$
j) $1\frac{9}{100}$ k) $4\frac{3}{10}$ l) 2 m) $1\frac{3}{5}$ n) 10 o) $5\frac{7}{10}$ p) $1\frac{50}{100}$ or $1\frac{1}{2}$ q) 9 r) $5\frac{2}{4}$ or $5\frac{1}{2}$

23. a) $\frac{2}{4}$ b) $\frac{5}{10}$ c) $\frac{50}{100}$ d) $\frac{4}{20}$ e) $\frac{10}{50}$ f) $\frac{20}{100}$ g) $\frac{6}{4}$ h) $\frac{15}{10}$ i) $\frac{150}{100}$
j) $\frac{16}{20}$ k) $\frac{40}{50}$ l) $\frac{80}{100}$ m) $\frac{6}{10}$ n) $\frac{1}{2}$ o) $\frac{3}{5}$ p) $\frac{1}{10}$ q) $\frac{4}{4}$ r) $\frac{3}{4}$

24. a) $r = \frac{3}{2}$ or $1\frac{1}{2}$ b) $c = \frac{5}{5}$ or 1 c) $k = \frac{6}{4}$ or $1\frac{1}{2}$ d) $a = \frac{10}{10}$ or 1
e) $p = \frac{100}{100}$ or 1 f) $h = \frac{7}{5}$ or $1\frac{2}{5}$ g) $e = \frac{10}{4}$ or $2\frac{1}{2}$ h) $q = \frac{4}{2}$ or 2
i) $f = \frac{11}{10}$ or $1\frac{1}{10}$ j) $n = \frac{50}{100}$ or $\frac{1}{2}$ k) $g = \frac{8}{5}$ or $1\frac{3}{5}$ l) $d = \frac{4}{4}$ or 1

25. a) $\frac{2}{4}$ or $\frac{1}{2}$ b) $\frac{3}{5}$ c) $\frac{2}{10}$ or $\frac{1}{5}$ d) $\frac{2}{2}$ or 1 e) $\frac{5}{5}$ or 1
f) $\frac{7}{10}$ g) $\frac{2}{2}$ or 1 h) $\frac{10}{100}$ or $\frac{1}{10}$ i) $\frac{1}{5}$ j) $\frac{10}{100}$ or $\frac{1}{10}$

26. a) 16 cm b) 11 cm c) 16 cm d) 13.5 cm

27. a) 280 cm b) 40 cm c) 400 mm

28. 12 cm 29. 2880 30. a) 5 h b) 13 h c) 11 h 31. No 32. 19 a 33. 11 h 11 min

34. 35 min 35. 121 a 36. 24.6 km/h 37. 8 a 38. a) 3780 b) 37 800

Further Practice/Unit 2 Place Value, Addition and Subtraction

1. Write the standard numeral.
   a) 9 tens and 4 b) 8 hundreds, 0 tens, and 7 c) 5 thousands and 6
   d) 2 ten thousands, 6 thousands, 4 hundreds, 3 tens, and 1
   e) 7 hundred thousands, 1 ten thousand, 5 thousands, 4 hundreds, 1 ten, and 6
   f) 2 hundred thousands, 8 ten thousands, 3 thousands, 6 hundreds, 9 tens, and 9
   g) 2 hundred thousands and 4 hundreds h) 6 hundred thousands, 3 thousands, and 9
   i) 5 hundred thousands and 4 ten thousands j) 9 hundred thousands and 3
2. Make as many numerals as you can using all the digits.
   a) 4,6,3 b) 1,9,4 c) 4,0,9 d) 2,7,3 e) 6,4,1,8
3. Write the value of each coloured digit.
   a) 246 1**3**5 b) 3**9**0 621 c) 803 42**6** d) 15**2** 807
   e) **3**86 005 f) 47**7** 618 g) 562 41**0** h) 9**1**3 724
4. Add.
   a) 423 625 + 375 b) 846 312 + 3 788 c) 196 419 + 3 581
   d) 287 106 + 2 900 e) 304 873 + 5 130 f) 609 999 + 90 001
5. Subtract.
   a) 287 604 − 7 604 b) 809 146 − 9 000 c) 550 505 − 50 005
   d) 346 097 − 40 097 e) 728 561 − 28 561 f) 946 238 − 40 208
6. Write the greatest number. Use all the digits.
   a) 3,8,1,5 b) 0,9,7,6 c) 4,1,7,8 d) 6,2,1,8 e) 0,9,9,0
7. Write the least number. Use all the digits.
   a) 7,1,6,3 b) 9,4,5,7 c) 1,8,0,4 d) 6,3,9,2 e) 8,0,5,0
8. Jack had 3 tens more than Marie.
   Marie had 3246. What is Jack's number?
9. Alice had 8 hundreds more than Arlene.
   Arlene had 9327. What is Alice's number?
10. Ian's number is larger than Ruth's by
    1 thousand and 4 tens.
    Ruth has 824 026.
    What is Ian's number?
11. Bob's number is 4 ten thousands less than
    Jerry's number. Jerry has 70 624.
    What is Bob's number?

Place Value, Addition and Subtraction/Decimals

12. Write the standard numeral.

a) 3 tens, 4 ones, and 2 tenths b) 9 tens, 2 ones, 6 tenths, and 1 hundredth
c) 2 ones, 9 tenths, 5 hundredths, and 3 thousandths
d) 6 tenths and 1 hundredth e) 1 ten, 3 ones, and 4 hundredths
f) 9 ones, 3 tenths, and 8 thousandths
g) 6 thousands, 1 ten, 7 ones, 2 tenths, 6 hundredths, and 8 thousandths
h) 3 ten thousands, 4 tens, 8 ones, 1 tenth, 9 hundredths, and 3 thousandths
i) 8 hundreds, 4 tens, and 4 hundredths
j) 9 thousands, 8 ones, and 7 thousandths

13. Add.

$$\text{a) }\begin{array}{r}436\\24\\9\\\underline{362}\end{array}\quad\text{b) }\begin{array}{r}834\\107\\9\\\underline{320}\end{array}\quad\text{c) }\begin{array}{r}149\\840\\76\\\underline{29}\end{array}\quad\text{d) }\begin{array}{r}1\,463\\287\\9\,371\\\underline{805}\end{array}\quad\text{e) }\begin{array}{r}4963\\21\\1752\\\underline{7}\end{array}\quad\text{f) }\begin{array}{r}894\\3\,006\\840\\\underline{9\,175}\end{array}\quad\text{g) }\begin{array}{r}621\\7486\\392\\\underline{18}\end{array}$$

h) 643 + 14 + 6 i) 406 + 200 + 16 + 4 j) 6493 + 17 + 305

$$\text{k) }\begin{array}{r}34.1\\1.6\\40.6\\\underline{5.5}\end{array}\quad\text{l) }\begin{array}{r}3.46\\0.12\\0.35\\\underline{1.06}\end{array}\quad\text{m) }\begin{array}{r}12.51\\18.87\\0.49\\\underline{5.26}\end{array}\quad\text{n) }\begin{array}{r}5.461\\0.257\\3.981\\\underline{1.163}\end{array}\quad\text{o) }\begin{array}{r}864.2\\91.8\\162.4\\\underline{342.1}\end{array}\quad\text{p) }\begin{array}{l}1.47\\4.62\\3.402\\\underline{7.814}\end{array}\quad\text{q) }\begin{array}{l}4.6\\8.24\\6.871\\\underline{3.102}\end{array}$$

r) 43.6 + 1.4 + 0.2 s) 1.462 + 3.401 + 6.3 t) 5.62 + 3.871 + 1.067

14. Subtract.

$$\text{a) }\begin{array}{r}9463\\\underline{5231}\end{array}\quad\text{b) }\begin{array}{r}6475\\\underline{5238}\end{array}\quad\text{c) }\begin{array}{r}3824\\\underline{1167}\end{array}\quad\text{d) }\begin{array}{r}9143\\\underline{2718}\end{array}\quad\text{e) }\begin{array}{r}4328\\\underline{1549}\end{array}\quad\text{f) }\begin{array}{r}3480\\\underline{1735}\end{array}\quad\text{g) }\begin{array}{r}9084\\\underline{2763}\end{array}$$

$$\text{h) }\begin{array}{r}764.5\\\underline{303.5}\end{array}\quad\text{i) }\begin{array}{r}423.6\\\underline{183.7}\end{array}\quad\text{j) }\begin{array}{r}9.046\\\underline{3.643}\end{array}\quad\text{k) }\begin{array}{r}8.723\\\underline{4.006}\end{array}\quad\text{l) }\begin{array}{r}12.64\\\underline{6.35}\end{array}\quad\text{m) }\begin{array}{r}7.462\\\underline{0.867}\end{array}\quad\text{n) }\begin{array}{r}578.3\\\underline{99.4}\end{array}$$

15. Solve.

a) $k = 4 + 6 + 3$ b) $r = 18 - 6$ c) $n = 4.6 + 3.2$ d) $f = 8.6 - 3.5$
e) $p = 1.47 + 6.32$ f) $e = 13.5 - 4.9$ g) $a = 12 + 3.4$ h) $d = 120 + 0.43$
i) $m = 34.1 + 0.5$ j) $q = 13.4 + 0.03$

Long Division

16. Complete using < or > or =.

a) 7 × 8 ? 56 b) 9 × 6 ? 55 c) 5 × 9 ? 44 d) 7 × 9 ? 64

e) 20 × 4 ? 80 f) 5 × 90 ? 460 g) 6 × 30 ? 175 h) 9 × 40 ? 370

17. Draw each array. Circle groups to illustrate each division question.

a)

× × × × ×
× × × × ×
× × × × ×
× × × × ×

20 ÷ 4 = ?

b)

× × × × × ×
× × × × × ×
× × × × × ×
× × × × × ×

24 ÷ ? = 4

c)

× × × × × × × × × × × ×
× × × × × × × × × × × ×
× × × × × × × × × × × ×
× × × × × × × × × × × ×

48 ÷ 6 = ?

18. Write the divisor for each question.

a) 42 ÷ ? = 7 b) 63 ÷ ? = 9 c) 81 ÷ ? = 9 d) 56 ÷ ? = 7

e) 450 ÷ ? = 50 f) 720 ÷ ? = 90 g) 360 ÷ ? = 60 h) 490 ÷ ? = 70

19. Use the new long division method to solve these questions.

a) 48 ÷ 4 b) 69 ÷ 3 c) 82 ÷ 2 d) 95 ÷ 5 e) 91 ÷ 7

f) 105 ÷ 5 g) 192 ÷ 6 h) 294 ÷ 7 i) 186 ÷ 6 j) 198 ÷ 9

k) 217 ÷ 7 l) 128 ÷ 8 m) 152 ÷ 4 n) 150 ÷ 5 o) 880 ÷ 8

p) 700 ÷ 5 q) 618 ÷ 6 r) 763 ÷ 7 s) 404 ÷ 4 t) 600 ÷ 2

u) 772 ÷ 4 v) 615 ÷ 5 w) 786 ÷ 6 x) 963 ÷ 3 y) 999 ÷ 9

20. 108 hockey games; 9 games per school.
How many schools?

21. 270 children; 6 buses.
How many children on each bus?

22. 144 chairs; 8 chairs in a row.
How many rows in the auditorium?

23. 350 stairs; climb takes 7 min.
How many stairs in 1 min?

24. 195 pages; 5 days to read book.
How many pages a day?

25. 756 km; each person walked 9 km.
How many people were in the walkathon?

Multiplication and Division/Decimals

26. Complete the patterns.

a) 14 × 100 = ?
14 × 10 = ?
14 × 1 = ?
14 × 0.1 = ?

b) 1.4 × 100 = ?
1.4 × 10 = ?
1.4 × 1 = ?
1.4 × 0.1 = ?

c) 2.4 × 100 = ?
2.4 × 10 = ?
2.4 × 1 = ?
2.4 × 0.1 = ?

d) 0.5 × 100 = ?
0.5 × 10 = ?
0.5 × 1 = ?
0.5 × 0.1 = ?

e) 0.2 × 100 = ?
0.2 × 10 = ?
0.2 × 1 = ?
0.2 × 0.1 = ?

f) 190 ÷ 100 = ?
190 ÷ 10 = ?
190 ÷ 1 = ?
190 ÷ 0.1 = ?

g) 19 ÷ 100 = ?
19 ÷ 10 = ?
19 ÷ 1 = ?
19 ÷ 0.1 = ?

h) 1.9 ÷ 100 = ?
1.9 ÷ 10 = ?
1.9 ÷ 1 = ?
1.9 ÷ 0.1 = ?

27. Multiply. Check by estimating.

a) $\begin{array}{r} 52.6 \\ \underline{\quad 8} \end{array}$ b) $\begin{array}{r} 90.8 \\ \underline{\quad 6} \end{array}$ c) $\begin{array}{r} 8.12 \\ \underline{\quad 9} \end{array}$ d) $\begin{array}{r} 6.43 \\ \underline{\quad 5} \end{array}$ e) $\begin{array}{r} 7.92 \\ \underline{\quad 7} \end{array}$ f) $\begin{array}{r} 0.46 \\ \underline{\quad 5} \end{array}$ g) $\begin{array}{r} 1.07 \\ \underline{\quad 4} \end{array}$

28. Find the products.

a) 84.3 × 9 b) 9.41 × 6 c) 5.49 × 9 d) 2.36 × 7 e) 74.7 × 8 f) 0.87 × 6

29. Divide.

a) $7\overline{)31.5}$ b) $4\overline{)26.0}$ c) $5\overline{)49.5}$ d) $6\overline{)24.6}$ e) $8\overline{)31.2}$

f) $6\overline{)52.2}$ g) $9\overline{)50.4}$ h) $7\overline{)47.6}$ i) $4\overline{)42.4}$ j) $3\overline{)30.9}$

30. Find the answers.

a) 340 ÷ 5 b) 208 ÷ 4 c) 444 ÷ 6 d) 747 ÷ 9 e) 658 ÷ 7

31. Length of string 52.5 m.
How much will each of 5 students receive?

32. Length of board 12.6 m.
It is cut into 6 pieces. How long is each piece?

33. Length of mural paper is 16.4 m.
Each student has 4 m.
How many students can work on the mural?

34. Perimeter of an octagon is 84.0 cm.
What is the length of each side?

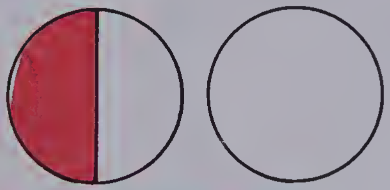
35. A car travels 388 km in 8 h.
What is the average speed for 1 h?

36. 40.5 ℓ of liquid is divided into 5 containers.
How much is placed in each?

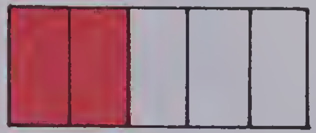
Fractions and Area

37. Draw and mark each diagram to show that:

a) $\frac{1}{2} = \frac{2}{4}$

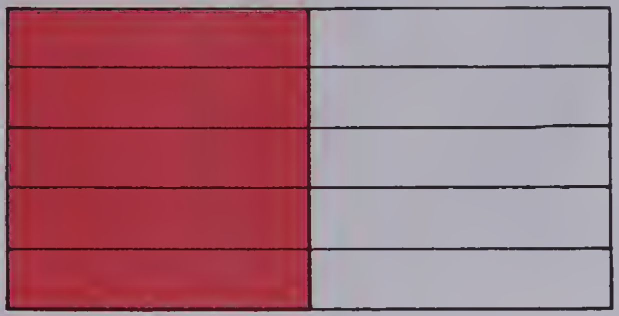


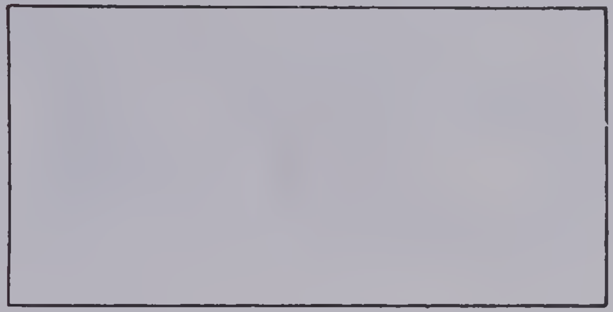
b)



$\frac{2}{5} = \frac{4}{10}$

c) $\frac{5}{10} = \frac{50}{100}$





38. Add.

a) $\frac{1}{2} + \frac{1}{2}$ b) $\frac{2}{4} + \frac{1}{4}$ c) $\frac{3}{5} + \frac{1}{5}$ d) $\frac{8}{10} + \frac{3}{10}$ e) $\frac{3}{2} + \frac{1}{2}$ f) $\frac{1}{4} + \frac{5}{4}$

g) $\frac{1}{4} + \frac{1}{2}$ h) $\frac{1}{5} + \frac{1}{10}$ i) $\frac{1}{4} + \frac{3}{2}$ j) $\frac{4}{5} + \frac{1}{10}$ k) $\frac{4}{10} + \frac{2}{5}$ l) $\frac{1}{2} + \frac{7}{4}$

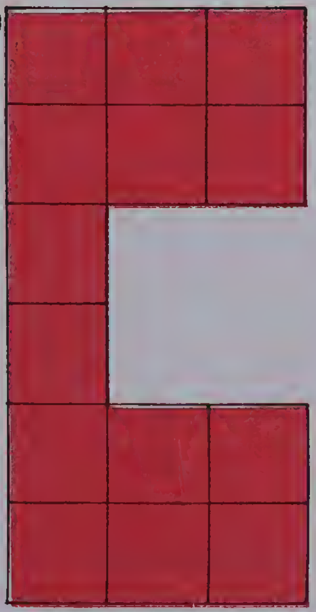
39. Subtract.

a) $\frac{2}{2} - \frac{1}{2}$ b) $\frac{3}{4} - \frac{2}{4}$ c) $\frac{4}{5} - \frac{2}{5}$ d) $\frac{8}{10} - \frac{3}{10}$ e) $\frac{1}{2} - \frac{1}{4}$ f) $\frac{4}{10} - \frac{1}{5}$

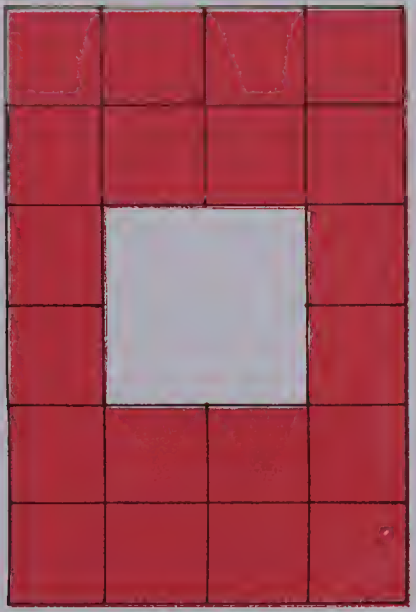
g) $\frac{7}{10} - \frac{2}{5}$ h) $\frac{7}{4} - \frac{1}{2}$ i) $\frac{8}{5} - \frac{2}{10}$ j) $\frac{5}{4} - \frac{2}{2}$ k) $\frac{12}{5} - \frac{20}{10}$ l) $\frac{20}{4} - \frac{8}{2}$

40. Estimate, then find the area of these shapes in square centimetres.

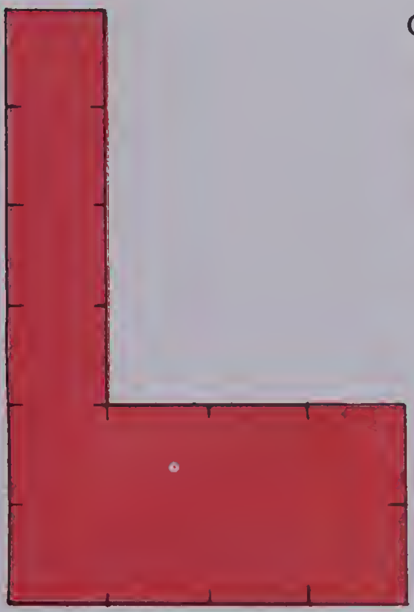
a)



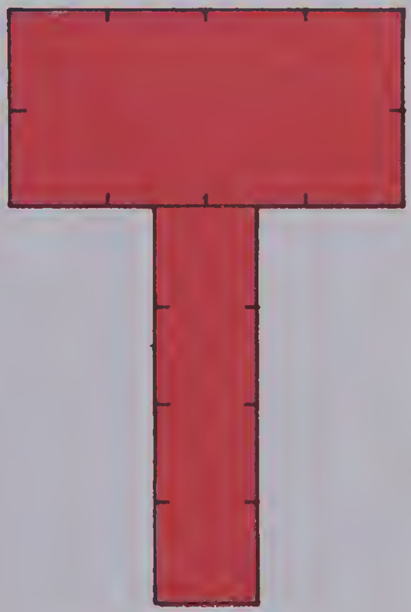
b)



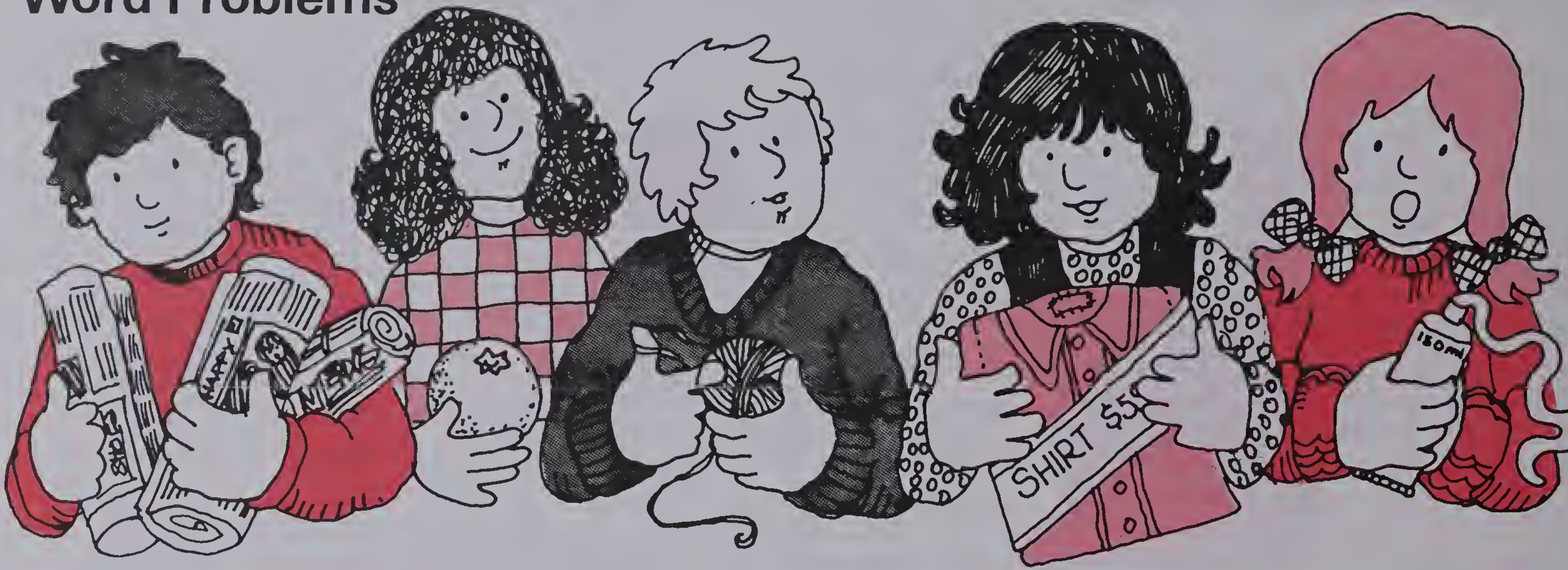
c)



d)



Word Problems



41. Ken delivers 80 papers. He increased the size of his route 0.1 times. How many new customers did he get?

43. Pierre jumped 0.1 times further than Jacques. Jacques jumped 150 cm. How far did Pierre jump?

45. Wayne paid 90¢ for a pen. Tom paid 0.1 times less for a pen. How much did Tom pay for his pen?

47. 1 postcard and stamp costs $0.18. How much will it cost to send 9 cards?

49. A ball of string 65.5 m is cut into 100 pieces. What is the length of each piece?

51. A school bus travels 84.5 km in 1 d. How far will it travel in 5 d?

53. Apples cost 30¢ each. How much will 6 cost?

55. The area of 6 floor tiles is 1800 cm^2. What is the area of 1 floor tile?

42. The length of a box is 30 cm. The width is 0.1 times the length. What is the width?

44. Maureen weighs 30 kg. Sue weighs 0.1 times less than Maureen. How much does Sue weigh?

46. 1 shirt costs $5.95. How much will 10 cost?

48. A length of cloth measuring 25.5 m is cut into 10 pieces. What is the length of each piece of cloth?

50. A board measures 1.5 m by 0.1 m. What is its perimeter?

52. A tube contains 150 ml of handcream. If 1 squeeze produces 2 ml, how many squeezes can you make before it is empty?

54. Grapefruit sell 3 for 69¢. How much will 1 cost?

56. The perimeter of a square carpet is 12 m. What is the length of 1 side of the square?

Answers to Further Practice/Unit 2

1. a) 94 b) 807 c) 5006 d) 26 431 e) 715 416 f) 283 699 g) 200 400 h) 603 009 i) 540 000
j) 900 003

2. a) 463, 436, 634, 643, 346, 364 b) 194, 149, 941, 914, 419, 491
c) 409, 490, 094, 049, 940, 904 d) 273, 237, 732, 723, 327, 372
e) 6418, 6148, 6841, 4186, 4861, 4618, 1864, 1648, 1486, 8641, 8416, 6184,
8164, 6814, 4168, 4816, 4681, 6481, 1846, 1684, 1468, 8614, 8461

3. a) 3 tens b) 9 ten thousands c) 6 ones d) 2 thousands
e) 3 hundred thousands f) 7 thousands g) 0 ones h) 1 ten thousand

4. a) 424 000 b) 850 100 c) 200 000 d) 290 006 e) 310 003 f) 700 000

5. a) 280 000 b) 800 146 c) 500 500 d) 306 000 e) 700 000 f) 906 030

6. a) 8531 b) 9760 c) 8741 d) 8621 e) 9900

7. a) 1367 b) 4579 c) 0148 d) 2369 e) 0058

8. 3276 9. 10 127 10. 825 066 11. 30 624

12. a) 34.2 b) 92.61 c) 2.953 d) 0.61 e) 13.04 f) 9.308 g) 6017.268
h) 30 048.193 i) 840.04 j) 9008.007

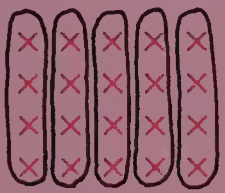
13. a) 831 b) 1270 c) 1094 d) 11 926 e) 6743 f) 13 915 g) 8517
h) 663 i) 626 j) 6815 k) 81.8 l) 4.99 m) 37.13 n) 10.862
o) 1460.5 p) 17.306 q) 22.813 r) 45.2 s) 11.163 t) 10.558

14. a) 4232 b) 1237 c) 2657 d) 6425 e) 2779 f) 1745 g) 6321
h) 461.0 i) 239.9 j) 5.403 k) 4.717 l) 6.29 m) 6.595 n) 478.9

15. a) $k = 13$ b) $r = 12$ c) $n = 7.8$ d) $f = 5.1$ e) $p = 7.79$
f) $e = 8.6$ g) $a = 15.4$ h) $d = 120.43$ i) $m = 34.6$ j) $q = 13.43$

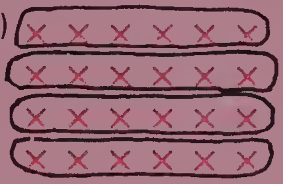
16. a) = b) < c) > d) < e) = f) < g) > h) <

17. a)



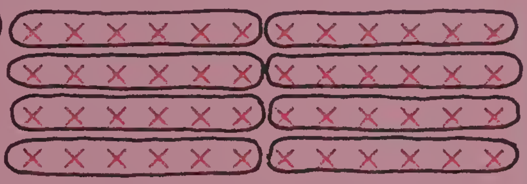
20 ÷ 4 = 5

b)



24 ÷ 6 = 4

c)



48 ÷ 6 = 8

18. a) 6 b) 7 c) 9 d) 8 e) 9 f) 8 g) 6 h) 7

19. a) 12 b) 23 c) 41 d) 19 e) 13 f) 21 g) 32
h) 42 i) 31 j) 22 k) 31 l) 16 m) 38 n) 30
o) 110 p) 140 q) 103 r) 109 s) 101 t) 300 u) 193
v) 123 w) 131 x) 321 y) 111

20. 12 21. 45 22. 18 23. 50 24. 39 25. 84

26.

a)	b)	c)	d)
1400	140	240	50
140	14	24	5
14	1.4	2.4	0.5
1.4	0.14	0.24	0.05

e)	f)	g)	h)
20	1.90	0.19	0.019
2	19.0	1.9	0.19
0.2	190	19	1.9
0.02	1900	190	19

27. a) 420.8 b) 544.8 c) 73.08 d) 32.15 e) 55.44 f) 2.30 g) 4.28

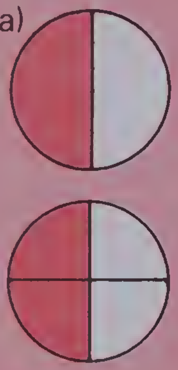
28. a) 758.7 b) 56.46 c) 49.41 d) 16.52 e) 597.6 f) 5.22

29. a) 4.5 b) 6.5 c) 9.9 d) 4.1 e) 3.9 f) 8.7 g) 5.6
h) 6.8 i) 10.6 j) 10.3

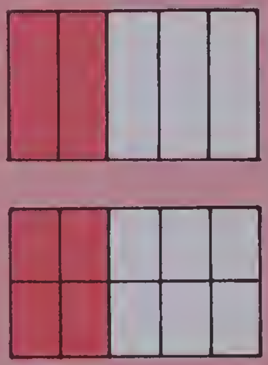
30. a) 68 b) 52 c) 74 d) 83 e) 94

31. 10.5 m 32. 2.0 m 33. 4 34. 10.5 cm 35. 48.5 km/h 36. 8.1 ℓ

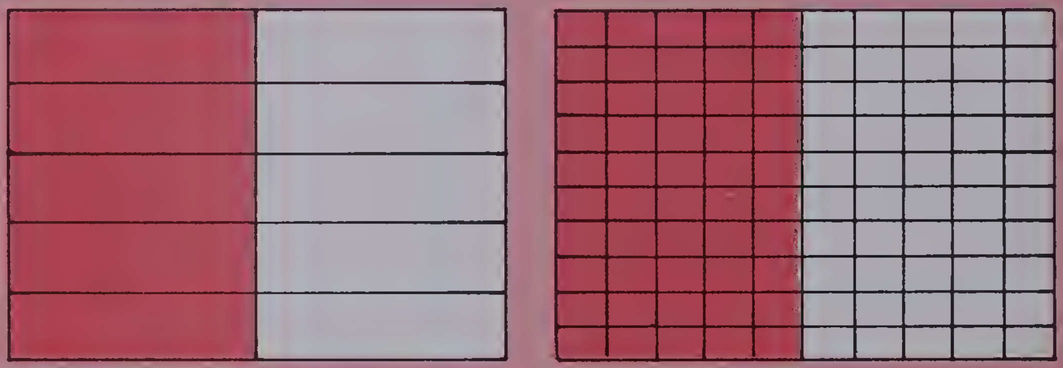
37. a)



b)



c)



38. a) $\frac{2}{2}$ or 1 b) $\frac{3}{4}$ c) $\frac{4}{5}$ d) $\frac{11}{10}$ or $1\frac{1}{10}$ e) $\frac{4}{2}$ or 2 f) $\frac{6}{4}$ or $1\frac{1}{2}$
g) $\frac{3}{4}$ h) $\frac{3}{10}$ i) $\frac{7}{4}$ or $1\frac{3}{4}$ j) $\frac{9}{10}$ k) $\frac{8}{10}$ or $\frac{4}{5}$ l) $\frac{9}{4}$ or $2\frac{1}{4}$

39. a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{2}{5}$ d) $\frac{5}{10}$ or $\frac{1}{2}$ e) $\frac{1}{4}$ f) $\frac{2}{10}$ or $\frac{1}{5}$
g) $\frac{3}{10}$ h) $\frac{5}{4}$ or $1\frac{1}{4}$ i) $\frac{14}{10}$ or $1\frac{2}{5}$ j) $\frac{1}{4}$ k) $\frac{4}{10}$ or $\frac{2}{5}$ l) $\frac{4}{4}$ or 1

40. a) 14 cm^2 b) 20 cm^2 c) 12 cm^2 d) 12 cm^2

41. 8 42. 3 cm 43. 165 cm 44. 27 kg 45. 81¢ 46. $59.50 47. $1.62 48. 2.55 m

49. 0.655 m 50. 3.2 m 51. 422.5 km 52. 75 53. $1.80 54. 23¢ 55. 300 cm^2 56. 3 m

Further Practice/Unit 3 Place Value and Exponents

1. Write the meaning form.
   a) population of Finland: 4 680 000 b) number of French-speaking Canadians: 5 793 650

2. Write the expanded form.
   a) number of passenger cars produced in U.S.A. for 1973: 9 667 125
   b) number of vehicles registered in Québec: 2 556 260

3. Arrange this list from greatest to least.

American homes with:	2 or more TV sets	28 360 999;
	colour sets	46 850 000;
	1 TV set	40 140 000;
	black and white set only	21 650 000

4. Write using exponents.
   a) 4×4 b) $8 \times 8 \times 8 \times 8$
   c) $9 \times 9 \times 9$ d) $5 \times 5 \times 5 \times 5 \times 5$
   e) $10 \times 10 \times 10$ f) $2 \times 2 \times 2 \times 2 \times 2 \times 2$
   g) 6×6 h) $1 \times 1 \times 1 \times 1 \times 1 \times 1$
   i) $7 \times 7 \times 7 \times 7$ j) $3 \times 3 \times 3 \times 3 \times 3$

5. Write the meaning form.
   a) 3^2 b) 6^4 c) 9^3 d) 5^6 e) 10^3 f) 8^5 g) 2^7

6. Find the value.
   a) 4^3 b) 2^6 c) 10^4 d) 9^2 e) 3^5 f) 5^3 g) 1^9

7. Write the standard numeral.
   a) $4(10^2)$ b) $3(10^4)$ c) $7(10^5)$ d) $5(10^3)$ e) $9(10^2)$ f) $6(10^6)$

8. Write the expanded form using exponents of 10.
   a) 4000 + 800 + 20 b) 9000 + 200 + 80 c) 60 000 + 5000 + 700 + 20
   d) 200 000 + 70 000 + 3000 + 600 + 40 e) 3 000 000 + 500 000 + 70 000 + 4000 + 20

9. Write the expanded form using exponents for these populations.
   a) Yukon 19 000 b) Nova Scotia 811 000 c) Newfoundland 541 000
   d) Saskatchewan 907 000 e) Québec 6 124 000 f) Ontario 8 067 000

Addition and Subtraction/Decimals

10. Add.

a)	b)	c)	d)	e)	f)
4.23	6.41	0.46	14.6	83.0	34.6
1.46	3.06	5.06	3.4	19.8	10.3
3.21	0.37	0.38	5.9	7.6	0.8

g)	h)	i)	j)	k)	l)
$14.36	$76.04	$32.00	$81.49	$136.42	$186.30
3.95	3.37	16.48	7.68	81.67	91.47
4.76	19.40	29.07	0.93	14.97	6.84

m)	n)	o)	p)	q)	r)
136.4	$0.68	1.463	$1.68	1.620	$185.64
7.8	9.47	0.614	3.97	0.647	30.95
40.6	1.05	0.701	0.60	9.321	16.00
139.0	0.10	3.019	0.91	6.009	8.76

11. Subtract.

a)	b)	c)	d)	e)	f)
4.68	1.47	94.6	13.7	0.61	0.632
3.19	0.28	37.6	9.9	0.47	0.297

g)	h)	i)	j)	k)	l)
$14.61	$16.32	$46.89	$90.47	$136.81	$156.78
7.56	15.24	13.07	56.98	47.23	59.99

m)	n)	o)	p)	q)	r)
748.6	526.3	$468.42	$964.30	4.906	$0.46
609.4	407.4	329.75	478.67	1.540	0.39

12. Find the total cost of a sweater $13.99, a shirt $9.98, and a tie $4.50.

13. Length of room 347.6 cm.
Length of wooden board 324.1 cm.
How much shorter is the board?

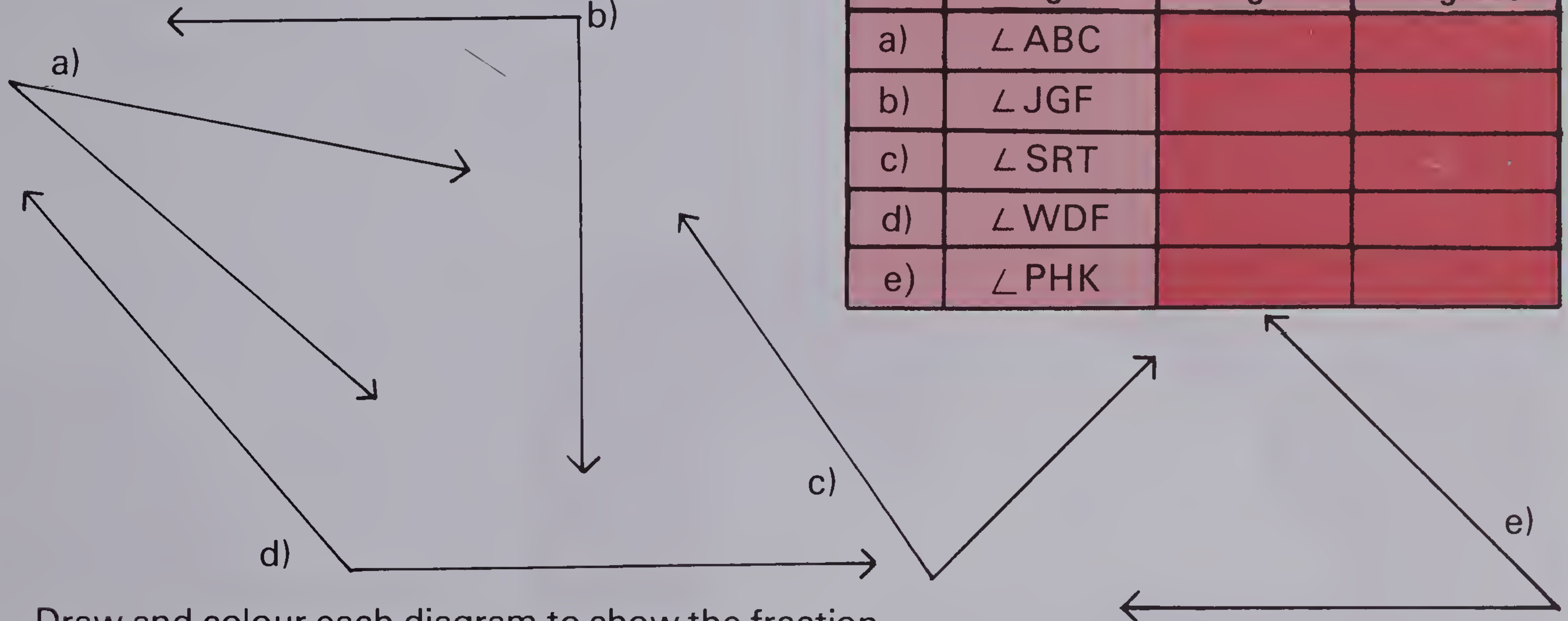
14. Boat costs $1468.72.
Second boat costs $1299.68.
How much cheaper is the second boat?

15. Skis $89.98 Poles $6.79
Bindings $39.95 Boots $49.49
Find the total cost.

Angles and Fractions

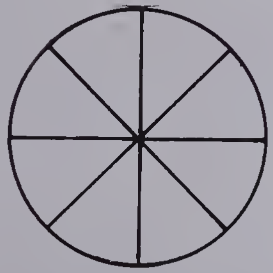
16. Trace and label each angle. Complete the chart.

	Name of angle	Type of angle	Number of degrees
a)	∠ABC		
b)	∠JGF		
c)	∠SRT		
d)	∠WDF		
e)	∠PHK		

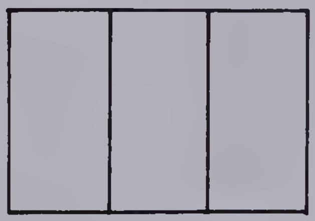


17. Draw and colour each diagram to show the fraction

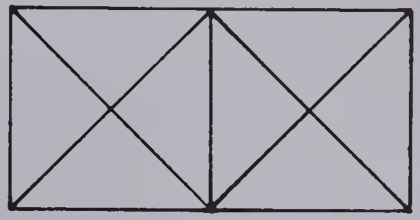
a) $\frac{4}{8}$



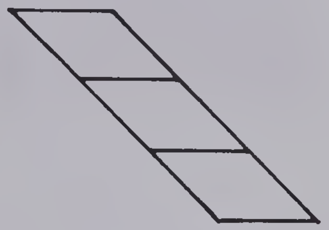
b) $\frac{1}{3}$



c) $\frac{3}{8}$



d) $\frac{2}{3}$



18. Write the fraction to express the uncoloured part in question 17.

19. State the factor and operation for each pair of equivalent fractions.

a) $\frac{3}{5}, \frac{6}{10}$ b) $\frac{5}{10}, \frac{1}{2}$ c) $\frac{4}{5}, \frac{80}{100}$ d) $\frac{2}{4}, \frac{50}{100}$ e) $\frac{8}{10}, \frac{4}{5}$ f) $\frac{6}{8}, \frac{3}{4}$

g) $\frac{5}{4}, \frac{125}{100}$ h) $\frac{12}{8}, \frac{3}{2}$ i) $\frac{75}{100}, \frac{3}{4}$ j) $\frac{120}{100}, \frac{6}{5}$ k) $\frac{3}{5}, \frac{60}{100}$ l) $\frac{7}{4}, \frac{14}{8}$

20. Complete.

a) $\frac{1}{2} = \frac{?}{8}$ b) $\frac{4}{5} = \frac{?}{10}$ c) $\frac{2}{8} = \frac{?}{4}$ d) $\frac{4}{10} = \frac{?}{5}$ e) $\frac{1}{2} = \frac{?}{10}$ f) $\frac{3}{4} = \frac{?}{8}$

g) $\frac{2}{4} = \frac{?}{100}$ h) $\frac{12}{8} = \frac{?}{2}$ i) $\frac{20}{100} = \frac{?}{5}$ j) $\frac{2}{5} = \frac{?}{100}$ k) $\frac{7}{10} = \frac{?}{100}$ l) $\frac{75}{100} = \frac{?}{4}$

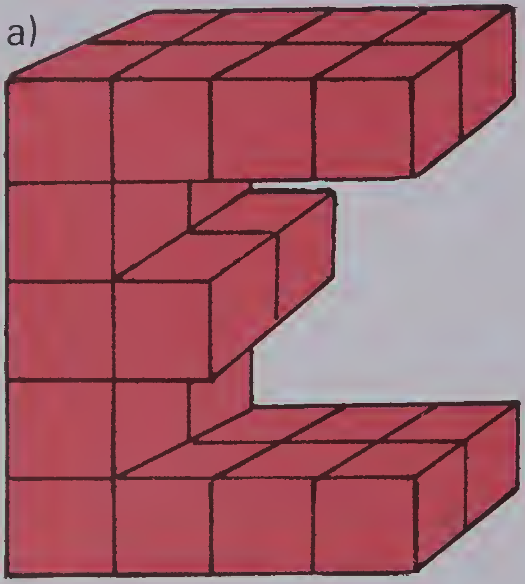
Length and Volume

21. Complete.

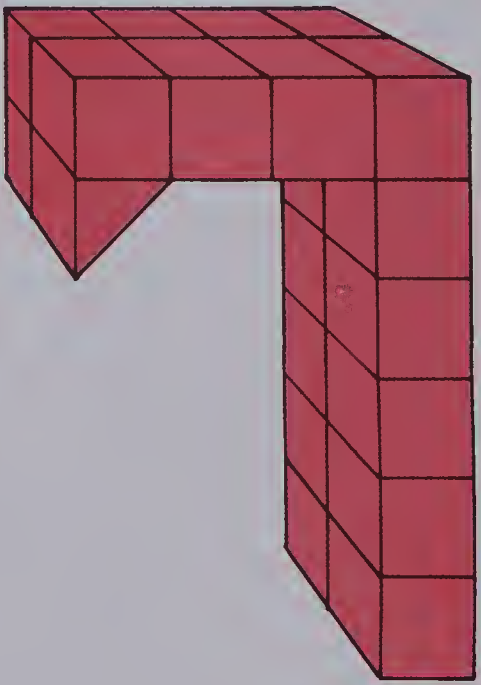
a) 10 dm = ? m
b) 10 cm = ? dm
c) 11 dm = ? m
d) 15 cm = ? dm
e) 1 dm = ? mm
f) 2.5 dm = ? cm
g) 24 dm = ? m
h) 150 mm = ? dm
i) 0.6 m = ? dm
j) 5 cm = ? dm
k) 60 mm = ? dm
l) 1.5 m = ? dm

22. Find the volume of each structure. Each cube is 1 cm.

a)

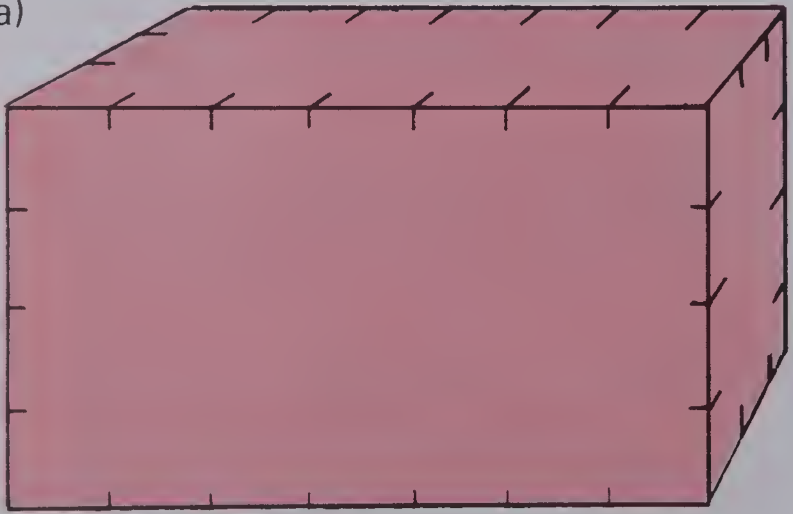


b)

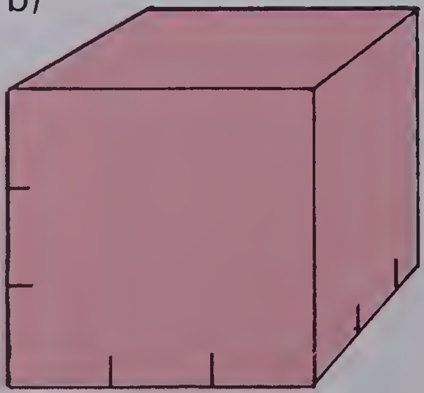


23. Each structure is made of 1 cm cubes.
What is the volume of each one?

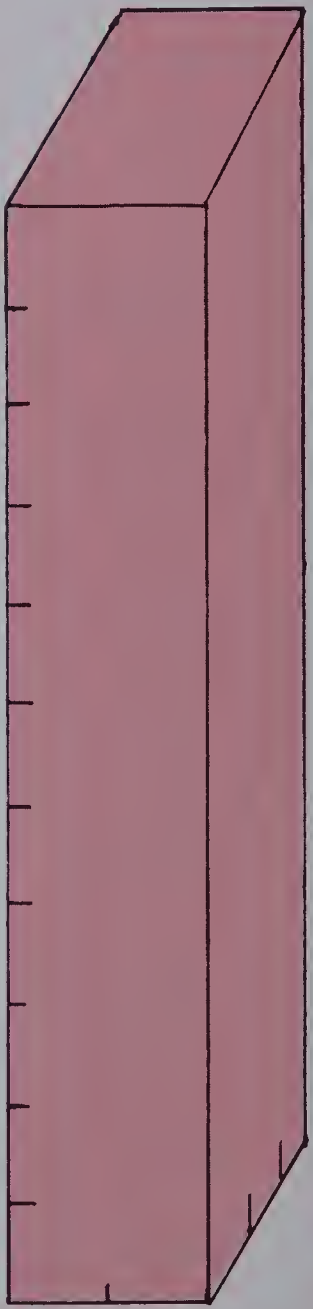
a)



b)



c)



Multiplication and Division

24. Multiply.

a) $\begin{array}{r}74\\ \underline{48}\end{array}$ b) $\begin{array}{r}31\\ \underline{1.5}\end{array}$ c) $\begin{array}{r}59\\ \underline{17}\end{array}$ d) $\begin{array}{r}48\\ \underline{32}\end{array}$ e) $\begin{array}{r}81\\ \underline{1.3}\end{array}$ f) $\begin{array}{r}69\\ \underline{27}\end{array}$ g) $\begin{array}{r}43\\ \underline{3.8}\end{array}$

h) $\begin{array}{r}24\\ \underline{1.8}\end{array}$ i) $\begin{array}{r}6.4\\ \underline{7}\end{array}$ j) $\begin{array}{r}9.1\\ \underline{32}\end{array}$ k) $\begin{array}{r}5.4\\ \underline{25}\end{array}$ l) $\begin{array}{r}7.8\\ \underline{49}\end{array}$ m) $\begin{array}{r}2.8\\ \underline{17}\end{array}$ n) $\begin{array}{r}5.5\\ \underline{35}\end{array}$

25. Find the product.

a) $\begin{array}{r}463\\ \underline{1.4}\end{array}$ b) $\begin{array}{r}397\\ \underline{2.6}\end{array}$ c) $\begin{array}{r}706\\ \underline{5.4}\end{array}$ d) $\begin{array}{r}390\\ \underline{6.4}\end{array}$ e) $\begin{array}{r}821\\ \underline{3.9}\end{array}$ f) $\begin{array}{r}500\\ \underline{8.7}\end{array}$ g) $\begin{array}{r}938\\ \underline{4.7}\end{array}$

h) $\begin{array}{r}28.4\\ \underline{3.2}\end{array}$ i) $\begin{array}{r}90.5\\ \underline{1.8}\end{array}$ j) $\begin{array}{r}73.2\\ \underline{4.9}\end{array}$ k) $\begin{array}{r}23.6\\ \underline{5.8}\end{array}$ l) $\begin{array}{r}3.97\\ \underline{8.2}\end{array}$ m) $\begin{array}{r}4.67\\ \underline{2.5}\end{array}$ n) $\begin{array}{r}6.87\\ \underline{6.3}\end{array}$

26. Round to the nearest unit.

a) 15.1 cm b) 9.3 mm c) 6.7 m d) 19.8 cm e) 135.9 m f) 0.7 mm

27. Round to the nearest tenth.

a) 13.13 b) 4.86 c) 26.08 d) 5.31 e) 48.04 f) 0.46

28. Divide. Give the quotient to the nearest unit.

a) $8\overline{)91}$ b) $6\overline{)56}$ c) $14\overline{)96}$ d) $24\overline{)164}$ e) $31\overline{)846}$ f) $18\overline{)144}$

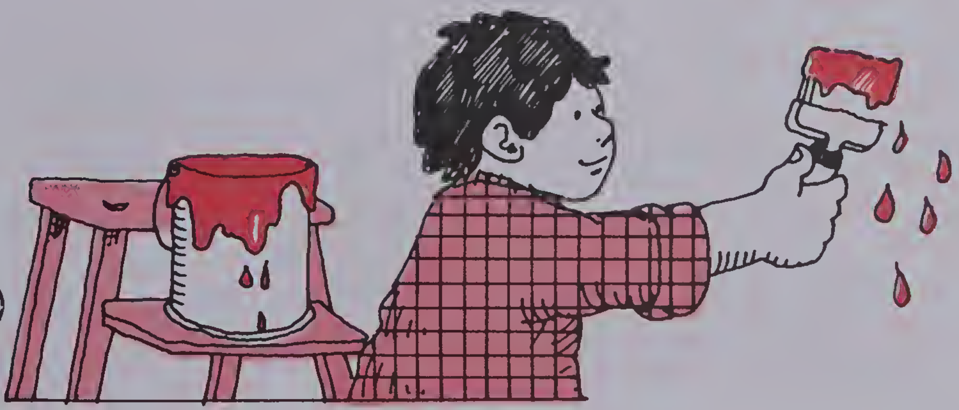
29. Divide. Give the quotient to the nearest tenth.

a) $3\overline{)61}$ b) $5\overline{)83}$ c) $8\overline{)45}$ d) $5\overline{)143}$ e) $9\overline{)14}$ f) $7\overline{)376}$

g) $12\overline{)118}$ h) $15\overline{)128}$ i) $19\overline{)187}$ j) $23\overline{)218}$ k) $25\overline{)984}$ l) $31\overline{)297}$

30. Divide to the nearest tenth of a metre 4 m of cloth into 6 equal pieces.

31. Jim painted 22 m^2 of wall in 3 h. How many m^2 did he paint in 1 h? (to the nearest tenth of a square metre)



Word Problems

32. What is the smallest number that can be added to 51 to make it divisible by 7?

33. What is the smallest number that can be added to 75 to make it divisible by 9?

34. Larry had 43 baseball cards. He lost 12 then gained 7. How many does he have now?

35. Lucy had 38 marbles. She lost 18 then gained 12. How many does she have now?

36. Sharon left home at 09:30. She returned home 4 h later. At what time did she return?

37. Jerry left for work at 07:45. He returned 9 h later. At what time did he return?

38. Meat costs \$4.50/kg. How much will 1.5 kg cost?

39. 1 m of cloth costs \$5.00. How much will 1.5 m cost?

40. 74 children want to play hockey. How many teams of 6 can be chosen?

41. 51 students want to play volley ball. How many teams of 8 can be chosen?

42. Myron answered $\frac{1}{2}$ of the questions. He answered 13 questions. How many questions were there?

43. Dawn has completed $\frac{1}{2}$ her workbook. She has 40 pages to go. How many pages are in the book?

44. How many grapefruit can Sharon buy for \$1.50, if they cost 75¢ for 3?

45. How many kilograms of bananas can Andrew buy for \$1.00, if they cost 25¢/kg?

46. What number is twice $\frac{1}{2}$ of 4?

47. What number is twice $\frac{1}{2}$ of 10?

48. Fernando is $\frac{1}{2}$ as old as Karen. Karen was 12 two years ago. How old is Fernando?

49. George is $\frac{1}{2}$ as old as Jennifer. Jennifer was 11 last year. How old is George?

50. Philip bought 4 pears at 20¢ each. He had 30¢ left. How many cents did he have at first?

51. Gwen bought 3 pencils at 15¢ each. She had 5¢ left. How many cents did she have at first?

Answers to Further Practice/Unit 3

1. a) 4 millions, 6 hundred thousands, and 8 ten thousands
   b) 5 millions, 7 hundred thousands, 9 ten thousands, 3 thousands, 6 hundreds, and 5 tens

2. a) 9 000 000 + 600 000 + 60 000 + 7000 + 100 + 20 + 5
   b) 2 000 000 + 500 000 + 50 000 + 6000 + 200 + 60

3. 46 850 000; 40 140 000; 28 360 999; 21 650 000

4. a) 4^2 b) 8^4 c) 9^3 d) 5^5 e) 10^3 f) 2^6 g) 6^2 h) 1^6 i) 7^4 j) 3^5

5. a) 3 × 3 b) 6 × 6 × 6 × 6 c) 9 × 9 × 9 d) 5 × 5 × 5 × 5 × 5 × 5 e) 10 × 10 × 10
   f) 8 × 8 × 8 × 8 × 8 g) 2 × 2 × 2 × 2 × 2 × 2 × 2

6. a) 64 b) 64 c) 10 000 d) 81 e) 243 f) 125 g) 1

7. a) 400 b) 30 000 c) 700 000 d) 5000 e) 900 f) 6 000 000

8. a) $4(10^3) + 8(10^2) + 2(10)$ b) $9(10^3) + 2(10^2) + 8(10)$
   c) $6(10^4) + 5(10^3) + 7(10^2) + 2(10)$
   d) $2(10^5) + 7(10^4) + 3(10^3) + 6(10^2) + 4(10)$
   e) $3(10^6) + 5(10^5) + 7(10^4) + 4(10^3) + 2(10)$

9. a) $1(10^4) + 9(10^3)$ b) $8(10^5) + 1(10^4) + 1(10^3)$
   c) $5(10^5) + 4(10^4) + 1(10^3)$ d) $9(10^5) + 7(10^3)$
   e) $6(10^6) + 1(10^5) + 2(10^4) + 4(10^3)$ f) $8(10^6) + 6(10^4) + 7(10^3)$

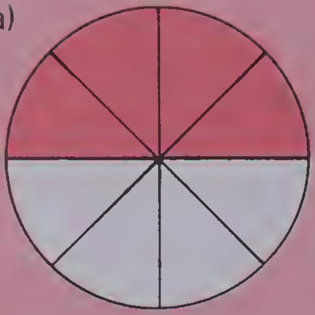
10. a) 8.90 b) 9.84 c) 5.90 d) 23.9 e) 110.4 f) 45.7
    g) \$23.07 h) \$98.81 i) \$77.55 j) \$90.10 k) \$233.06 l) \$284.61
    m) 323.8 n) 11.30 o) 5.797 p) \$7.16 q) 17.597 r) \$241.35

11. a) 1.49 b) 1.19 c) 57.0 d) 3.8 e) 0.14 f) 0.335
    g) \$7.05 h) \$1.08 i) \$33.82 j) \$33.49 k) \$89.58 l) \$96.79
    m) 139.2 n) 118.9 o) \$138.67 p) \$485.63 q) 3.366 r) \$0.07

12. \$28.47 13. 23.5 cm 14. \$169.04 15. \$186.21

16.

	Name of angle	Type of angle	Number of degrees
a)	∠ABC	Acute angle	30°
b)	∠JGF	Right angle	90°
c)	∠SRT	Acute angle	80°
d)	∠WDF	Obtuse angle	130°
e)	∠PHK	Acute angle	45°

17. a)


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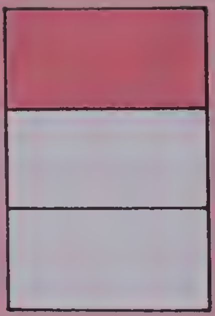

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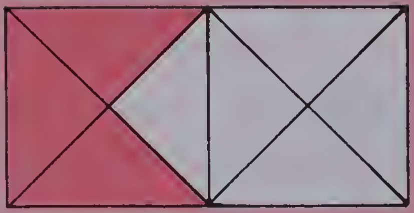
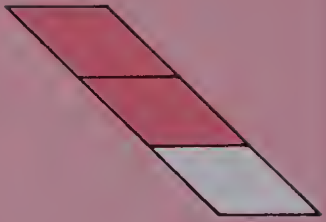


d)


18. a) $\frac{4}{8}$ b) $\frac{2}{3}$ c) $\frac{5}{8}$ d) $\frac{1}{3}$

19. a) 2, × b) 5, ÷ c) 20, × d) 25, × e) 2, ÷ f) 2, ÷
g) 25, × h) 4, ÷ i) 25, ÷ j) 20, ÷ k) 20, × l) 2, ×

20. a) $\frac{4}{8}$ b) $\frac{8}{10}$ c) $\frac{1}{4}$ d) $\frac{2}{5}$ e) $\frac{5}{10}$ f) $\frac{6}{8}$
g) $\frac{50}{100}$ h) $\frac{3}{2}$ i) $\frac{1}{5}$ j) $\frac{40}{100}$ k) $\frac{70}{100}$ l) $\frac{3}{4}$

21. a) 1 m b) 1 dm c) 1.1 m d) 1.5 dm e) 100 mm f) 25 cm
g) 2.4 m h) 1.5 dm i) 6 dm j) 0.5 dm k) 0.6 dm l) 15 dm

22. a) 24 cm^3 b) 19 cm^3

23. a) 84 cm^3 b) 66 cm^3 c) 27 cm^3

24. a) 3552 b) 46.5 c) 1003 d) 1536 e) 105.3 f) 1863 g) 163.4
h) 43.2 i) 44.8 j) 291.2 k) 135.0 l) 382.2 m) 47.6 n) 192.5

25. a) 648.2 b) 1032.2 c) 3812.4 d) 2496.0 e) 3201.9 f) 4350.0 g) 4408.6
h) 90.88 i) 162.90 j) 358.68 k) 136.88 l) 32.554 m) 11.675 n) 43.281

26. a) 15 cm b) 9 mm c) 7 m d) 20 cm e) 136 m f) 1 mm

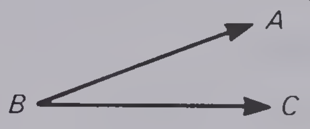
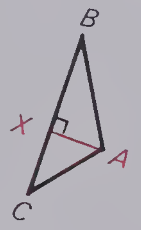
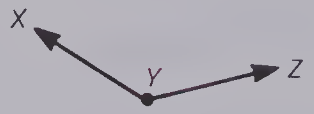
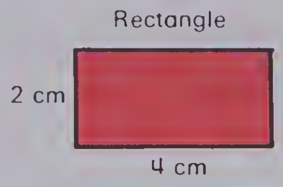
27. a) 13.1 b) 4.9 c) 26.1 d) 5.3 e) 48.0 f) 0.5

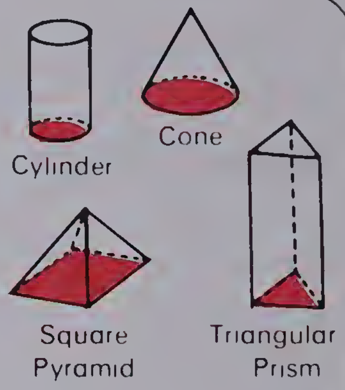
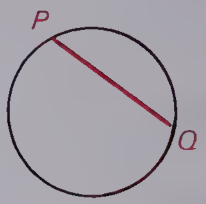
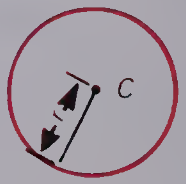
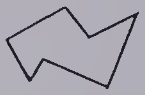
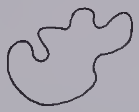
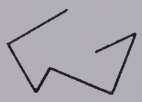
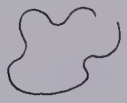
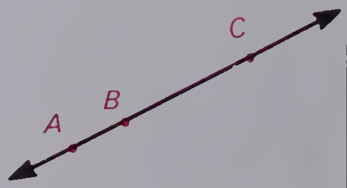
28. a) 11 b) 9 c) 7 d) 7 e) 27 f) 8

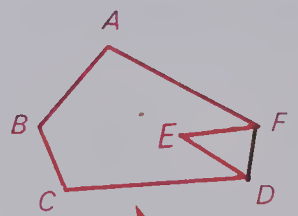
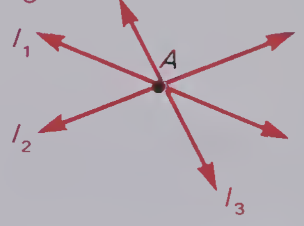
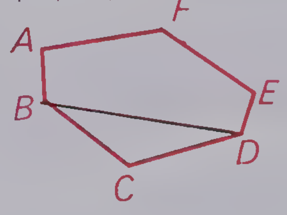
29. a) 20.3 b) 16.6 c) 5.6 d) 28.6 e) 1.6 f) 53.7
g) 9.8 h) 8.5 i) 9.8 j) 9.5 k) 39.4 l) 9.6

30. 0.7 m 31. 7.3 m^2 32. 5 33. 6 34. 38 35. 32 36. 13:30
37. 16:45 38. $6.75 39. $7.50 40. 12 41. 6 42. 26 43. 80
44. 6 45. 4 46. 4 47. 10 48. 7 49. 6 50. 110¢
51. 50¢

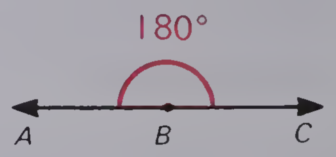
Mathematics Dictionary

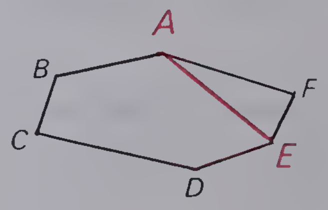
Acute Angle	An angle with measurement less than 90°. $\angle ABC$	
Acute Triangle	A triangle with all 3 angles acute.	
Addends	Numbers which are to be added. 2, 6, 11	2 + 6 + 11
Addition	An operation which combines 2 addends.	
Algorithm	A method for carrying out an operation.	
Altitude (of a Figure)	The line segment from a vertex perpendicular to the side opposite (or its length). (AX for $\triangle ABC$)	
Angle	2 rays with a common end point. $\angle XYZ$	
Anti-Clockwise	See *Counter-Clockwise*.	
Approximately Equal	1.9 × 9 is about 2 × 10 or 20.	
Area	An amount of surface. A number of square units which compares the size of a region to the size of a unit square region.	
Area Expressions	Area $= (2 \times 4)\ \text{cm}^2$ $= 8\ \text{cm}^2$	
Array	A set of objects in rows and columns.	
Associative (Grouping) Property	When 3 addends or factors are to be added or multiplied, any 2 may be added or multiplied first. $(3 + 2) + 5 = 3 + (2 + 5)$ $(3 \times 2) \times 5 = 3 \times (2 \times 5)$	
Average (Arithmetic Mean)	The quotient of a sum of numbers divided by the number of addends. $M = \frac{2 + 2 + 5 + 12 + 31}{5} = \frac{52}{5} = 10.4$	
Bar Graph	A graph in which the data is displayed by bars. A number of units of the data is represented by a unit bar.	

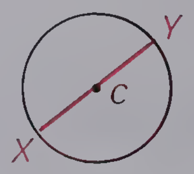
Base (of a Solid)	*Any* face of the solid. The coloured faces are usually considered bases, but any face may be taken as a base.	
Base (of a Triangle)	*Any* side of a triangle.	
Bisect	To separate a geometric figure into 2 congruent parts.	
Capacity	Another name for volume which is used in connection with volumes of liquids (e.g. the capacity of a container is 1 ℓ).	
Chord (of a Circle)	A line segment with both end points on a circle. *PQ*	
Circle	The set of points in a plane at a fixed distance (radius, *r*) from a given point (centre, *C*).	
Circumference	The perimeter (length) of a circle.	
Clockwise	The direction of rotation of the hands of a clock.	
Closed Figure (Curve)	 and  are closed figures.  and  are not closed figures.	
Collinear (Points)	3 or more points on the same straight line. *A, B, C*	
Common Factor	$6 = 3 \times 2$ $15 = 5 \times 3$ 3 is a common factor of 6 and 15. See *Greatest Common Factor.*	
Common Multiple	$12 = 6 \times 2$ $12 = 4 \times 3$ 12 is a common multiple of 6 and 4 (also of 2 and 3). See *Least Common Multiple.*	

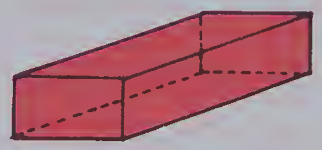
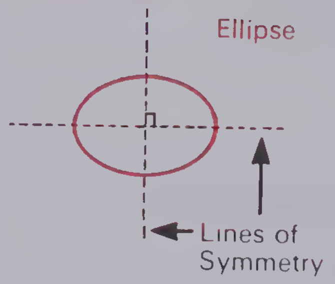
Commutative (Order) Property	2 numbers may be added or multiplied in either order. $2 + 3 = 3 + 2$ $2 \times 3 = 3 \times 2$	
Compass	An instrument used to indicate the direction of the North magnetic pole.	
Compasses (Pair of)	An instrument used in the drawing of a circle.	
Composite Number	A whole number which has more than 2 factors.	
Concave Polygon	*ABCDEF* is a concave polygon. At least 1 diagonal (*FD*) lies outside the polygon.	
Concurrent Lines	3 or more lines (l_1, l_2, l_3) with a common point (*A*).	
Congruent Figures	Geometric figures of the same size and shape.	
Consecutive	Next in order, as in **consecutive even whole numbers**.	6, 8, 10, 12
Convex Polygon	*ABCDEF* is a convex polygon. Every diagonal (*BD*, for example) lies within the polygon.	
Correspondence (One-to-One)	Each of the members in 2 sets is matched with exactly 1 member in the other set. $\{a, b, c, d, e\}$ $\updownarrow\ \updownarrow\ \updownarrow\ \updownarrow\ \updownarrow$ $\{1, 2, 3, 4, 5\}$	
Counter-Clockwise	The direction of rotation opposite to the hands of a clock.	
Counting	Matching objects in a set with a subset of the natural numbers 1, 2, 3, 4, ...	
Counting Numbers	Often called *natural numbers*. $N = \{1, 2, 3, 4, \ldots\}$ is the set of natural numbers.	
Cube	A regular solid with 6 faces. Each face is a square.	
Data	Numerical information.	

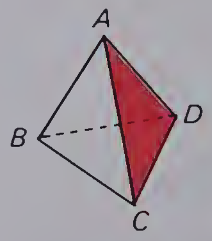
Decagon	A polygon with 10 sides.
Decimal	A numeral in decimal notation.
Decimal Numeration System	A place-value system based on powers of 10 (base 10) which represents numbers by using the 10 symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 as digits.
Decimal Place	The power of 10 associated with each position in a decimal numeral. 172.03 1 is in the hundreds place 7 is in the tens place 2 is in the units (ones) place 0 is in the tenths place 3 is in the hundredths place
Decimal Point	The dot in a decimal numeral between the units and tenths places.
Degree	A unit of angle measurement. The measurement of straight angle $\angle ABC$ is 180°
Denominator	10 is the denominator of the fraction $\frac{3}{10}$.
Diagonal (of a Polygon)	A line segment whose end points are 2 vertices which are not consecutive. AE is a diagonal of polygon $ABCDEF$.
Diameter	XCY is a diameter of the circle. The line segment passes through the centre of the circle.
Difference	The result of subtracting one number from another.
Digits	The individual symbols used in a numeration system. The digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 for our base 10 system.
Dimensions	For a plane (2-dimensional) figure—length and width. For a solid (3-dimensional) figure—length, width, and height.

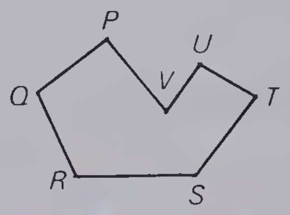
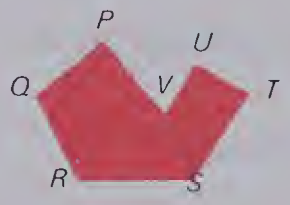
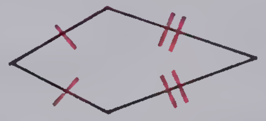
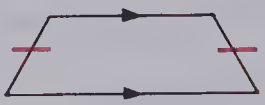
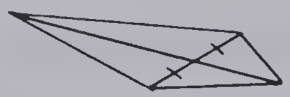


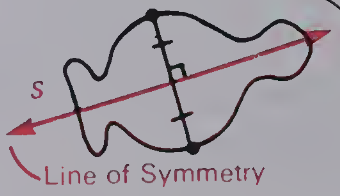
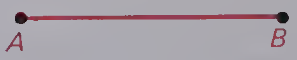
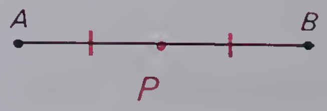
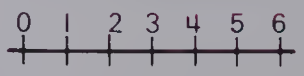


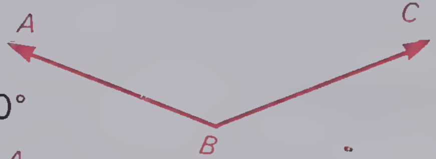
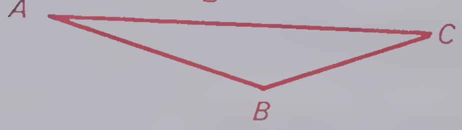
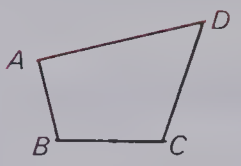
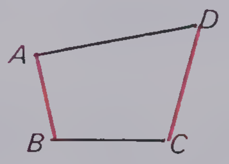
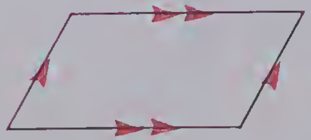


Distance (Between 2 Points in a Plane)	The length of the line segment joining the 2 points.	
Distributive Property (of Multiplication Over Addition)	$3 \times (2 + 5) = 3 \times 2 + 3 \times 5$	
Dividend	3 ← Quotient Divisor → 6) 23 ← **Dividend** $23 = 6 \times 3 + 5$ 18 5 ← Remainder	
Divisible	$6\overline{)30}$ with quotient 5 $30 = 6 \times 5$ 30 is divisible by 6	
Division	The undoing operation with respect to multiplication. *Multiplication* (doing) $3 \times 2 = 6$ *Division* (undoing) $6 \div 2 = 3$	
Divisor	See *Dividend.*	
Dodecagon	A polygon with 12 sides.	
Edge (of a Solid)	The black line segments are **edges** of the solid.	
Element (of a Set)	A member of a set.	
Ellipse	A closed plane figure like a circle stretched both ways along a diameter. An ellipse has only 2 lines of symmetry.	
Elliptical	In the shape of an ellipse.	
Empty Set	The set with no elements, { }.	
Equality	The relation between 2 symbols representing the same idea. $8 = 6 + 2$	
Equation	A statement expressing equality. $3 + 5 = 8$ $q + 2 = 6$	
Equilateral Triangle	A triangle with all sides of equal length.	

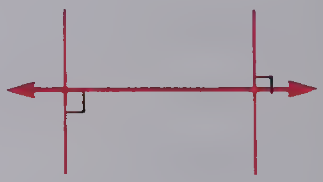
Equivalent Fractions	Fractions which represent the same number. $\frac{1}{2}, \frac{2}{4}, \frac{5}{10}, \frac{50}{100}, \ldots$
Estimate	A calculation usually made by rounding off numbers to a multiple of a power of 10. 9×31 is about 10×30 or 300
Even Number	An even number has 2 as a factor. $\{0, 2, 4, 6, \ldots\}$ is the set of even whole numbers.
Expanded Notation	$3124 = 3(1000) + 1(100) + 2(10) + 4$
Exponent	A number to indicate the number of times another number (the base) is multiplied by itself. 5^3 exponent base $5^3 = 5 \times 5 \times 5$
Face of a 3-D Figure	Triangular region *ADC* is one face of *ABCD*. 
Factor (of a Number)	$36 = 36 \times 1$ 36, 1 are factors of 36 $36 = 18 \times 2$ 18, 2 are factors of 36 $36 = 12 \times 3$ 12, 3 are factors of 36 $36 = 9 \times 4$ 9, 4 are factors of 36 $36 = 6 \times 3 \times 2$ 6, 3, 2 are factors of 36
Flip	A motion in which a figure is moved from one position to another. In the new position, the figure is a mirror reflection of the figure in the first position.
Flip Line	A figure is said to be flipped over a line from one position to another position.
Fraction	A symbol of the form $\frac{a}{b}$ where *a* and *b* are whole numbers and *b* is not equal to 0.
Geometric Figure	A set of points in a plane or in 3-D space.
Geometry	A study of shapes.
Graph	An illustration of information.

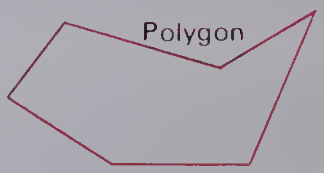
Greater Than	7 is greater than 3 (that is, $7 > 3$).	
Greatest Common Factor	$36 = 2 \times 2 \times 3 \times 3$ $24 = 2 \times 2 \times 2 \times 3$ The greatest common factor (GCF) of 24 and 36 is $2 \times 2 \times 3$ or 12	
Height (of a Figure)	Altitude of the figure. See *Altitude*.	
Hexagon	A polygon with 6 sides.	
Inequality	A mathematical sentence involving $>$ (is greater than) or $<$ (is less than).	
Interior (of a Plane Figure)	A polygon The interior of the polygon	 
Intersection	A common point in a common set of points. For example, 2 non-parallel lines in a plane intersect at a point.	
Inverse Operations	Addition and subtraction are inverse (**doing** and **undoing**) operations. Multiplication and division are inverse operations.	
Isosceles Kite	A kite with 2 pairs of adjacent equal sides.	
Isosceles Trapezium	The non-parallel sides are equal in length.	
Isosceles Triangle	2 sides are equal in length.	
Kite	A quadrilateral with 1 diagonal bisected by the other.	
Least Common Multiple	$8 = 2 \times 2 \times 2$ $12 = 2 \times 2 \times 3$ The least commom multiple (LCM) of 8 and 12 is $2 \times 2 \times 2 \times 3$ or 24	
Length	Describes a line segment.	
Less Than	3 is less than 7 ($3 < 7$).	
Letter Symbol	A letter used to represent a number. It is customary to use lower case letters.	

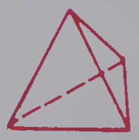
Line of Symmetry	If the figure is folded along the line *s*, the 2 parts of the figure coincide. The figure is symmetrical with respect to the line.	
Line Segment		Line Segment *AB* 
Mass	An amount of material. The amount is usually expressed in grams, kilograms, tonnes, etc.	
Matching	Setting up a one-to-one correspondence from the elements of one set to the elements of a second set. See *Correspondence* (*One-to-One*).	
Mathematics	The logical study of number, patterns, shape, and many related concepts.	
Metre	The basic unit of length in the metric system of measurement.	
Metric System	A decimal system of weights and measures, introduced in France in the 18th century, which is now used throughout most of the world.	
Mid-Point (of a Line Segment)	The point (*P*) which bisects a line segment (*AB*).	
Mixed Numeral	The mixed numeral $3\frac{1}{2}$ means $3 + \frac{1}{2}$	
Multiple	$3 \times 5 = 15$ $3 \times 12 = 36$ 15 and 36 are both multiples of 3.	
Multiplication	An operation which combines 2 factors.	
***n*-gon**	A polygon with *n* sides.	
Nonagon	A polygon with 9 sides.	
Number Line	An illustration of a set of numbers.	 Whole Number Line
Number Pair	A pair of numbers shown in the form (*a*, *b*). In an operation, the first number is used first and the second number is used second. For example, (5,2) for subtraction : the result is 5 − 2 or 3.	

Numeral	A symbol which represents a number.
Numerator	2 is the numerator of the fraction $\frac{2}{5}$.
Obtuse Angle	$\angle ABC$ has measurement between 90° and 180° 
Obtuse Triangle	$\triangle ABC$ has 1 interior obtuse angle ($\angle ABC$). 
Octagon	A polygon with 8 sides.
Odd Number	An odd number does not have 2 as a factor. $\{1, 3, 5, 7, \ldots\}$ is the set of odd whole numbers.
One-to-One Correspondence	See *Correspondence* (*One-to-One*).
Opposite Angles (of a Quadrilateral)	In quadrilateral $ABCD$, $\angle A$ and $\angle C$ are opposite angles, $\angle B$ and $\angle D$ are opposite angles. 
Opposite Sides (of a Quadrilateral)	Sides AB and CD have no vertex in common. They are opposite. 
Orbit	The path followed by a space body or a man-made space vehicle. The planet Earth has an **elliptical orbit** around the Sun.
Ordered Pair	A pair of numbers in a specific order. The ordered pair (1, 2) has the opposite order to (2, 1).
Parallel Lines	Lines in the same plane with no points in common.
Parallelogram	A quadrilateral with both pairs of opposite sides parallel. 
Pattern	A repeated sequence of numbers or objects.
Pentagon	A polygon with 5 sides.
Per Cent	A 2-term ratio with the second term 100. $\frac{37}{100}$ or 37%

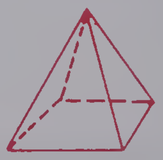
Perfect Square	The square of a whole number. See *Square (of a Number)*.
Perimeter	The length of the boundary of a region.
Perpendicular Lines	Lines or line segments which determine a right angle.
Pictograph	A graph in which a number of units is represented by a picture. The picture is related to the information displayed.
Place Value	In 235, 2 means 2 × 100. In 325, 2 means 2 × 10.
Plane Figure	A 2-dimensional figure in a plane.
Polygon	Closed plane figure : each side is a straight line segment.
Prime Number	A whole number which has exactly 2 factors.
Product	The result of multiplication.
Protractor	An instrument used to measure an angle.
Pyramid	A 3-dimensional figure.
Quadrilateral	A polygon with 4 sides.
Quotient	4 is called the quotient of 12 ÷ 3. See *Dividend*.
Radius	See *Circle*.
Ratio	A set of numbers usually used to indicate a comparison : e.g. 2 :3 :5 2-term ratio is used in 2 forms : e.g. 2 :3 or in fraction form $\frac{2}{3}$
Rectangle	A parallelogram with angles which are right angles.
Rectangular Region	The interior of a rectangle.





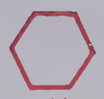
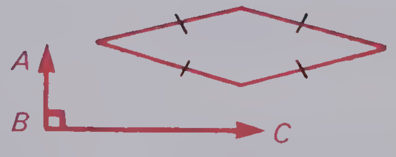
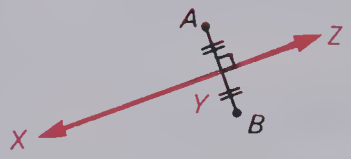
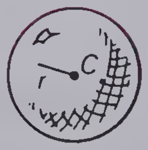


Triangular Pyramid

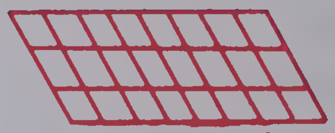


Square Pyramid

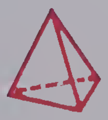
12 ÷ 3 = 4

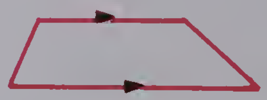
Rectangular Solid	A rectangular prism.	
Regular Polygon	A polygon with all sides equal and all angles equal.	 Regular Hexagon
Remainder	See *Dividend*.	
Rhombus	A quadrilateral with all sides of equal length.	
Right Angle	An angle ($\angle ABC$) with measurement 90°.	
Right Bisector (of a Line Segment)	The line XYZ such that $AY = YB$ and $\angle AYZ = 90°$.	
Scale, Horizontal	A number of units of a set of data is shown as a unit in a horizontal line.	
Scale, Vertical	A number of units of a set of data is shown as a unit in a vertical line.	
Scalene Triangle	A triangle with no 2 sides equal.	
Set	A collection of things.	
Shape	A figure and its interior.	
Slide	A motion in which a figure is moved a given distance in a given direction.	
Slide Arrow	An arrow → which indicates the distance and direction of a slide.	
Smooth Curve	A smooth curve is drawn through a set of points to show a relation.	
Solid	A 3-dimensional figure (*not* including its interior points).	
Sphere	The set of all points in space at a fixed distance (*radius*, *r* units) from a given point (*centre*, *C*).	Sphere 
Square	A rhombus with interior angles right angles.	
Square (of a Number)	The product of 2 equal factors. See *Perfect Square*.	$3 \times 3 = 3^2$ (read 3 squared)
Standard Numeral	A numeral formed by a number of digits in a row, e.g. 5783. Each digit to the left of a digit represents 10 times that digit.	

Straight-Line Graph	A graph in which the data is displayed by line segments. A number of units of the data is represented by a unit line segment.
Subtraction	The inverse (undoing) operation with respect to addition.
Subtrahend	A number which is subtracted from another number called the minuend.
Successive	See *Consecutive*.
Sum	The result of adding.
Symmetry (with Respect to a Line)	See *Line of Symmetry*.
Tally	A count of a set of data is usually organized in a tally form.
Tessellation	An arrangement of geometric shapes that would cover a plane.
Tetrahedron	A triangular pyramid.
Tiling	See *Tessellation*
Trapezium (Trapezoid)	A quadrilateral with 1 pair of opposite sides parallel. See *Isosceles Trapezium*.
Triangle	A polygon with 3 sides.
Turn	A motion in which a figure is moved from one position to another by turning.
Turn Centre	A point about which a figure is turned from one position to another.
Vertex (of a Polygon)	The point of intersection of adjacent sides of a polygon.
Volume	An amount of space.
Whole Numbers	$N_0 = \{0, 1, 2, 3, 4, \dots\}$ is the set of whole numbers.



Tessellation of Parallelograms





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